# NATIONAL COMMISSION ON AGRICULTURE
# 1976

## RAINFALL AND CROPPING PATTERNS

**Volume XI**

# ORISSA

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND IRRIGATION
NEW DELHI

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## RAINFALL AND CROPPING PATTERNS—STATE SERIES

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# RAINFALL AND CROPPING PATTERNS

## ORISSA

## INTRODUCTION

1.1 The human population of the country is estimated to rise from the 1971 Census figure of 548 million to 935 million in 2000 AD. This rise calls for increased production. Land resources being limited emphasis has to be placed on increasing productivity per unit area. Temperature and other climatic conditions being favourable for crop production throughout the year over most parts of the country, it is possible to grow more than one crop in a year provided water, the most important input, is available. In some parts of the country, the rainy season is long enough to provide scope for double cropping. This potential is yet to be fully exploited. There is scope for increasing irrigation resources in the country, but our estimates show that the area under irrigation is not expected to be more than 42 per cent of the total cropped area even in 2000 AD as against 22 per cent in 1970-71. Therefore, judicious utilisation of direct rainfall and irrigation water, singly and in combination, will have to be thought of for increasing production.

1.2 Farming technology has so advanced that it is possible to increase crop yields even under rainfed conditions, but the choice of crops would have to depend upon the amount and distribution of the prevailing rainfall. Additionally, it will be necessary that the maximum possible quantity of rain water is conserved in ponds and pools situated either within the farm area or elsewhere, in soil profiles and underground storages so that the same could be readily used to save crops in times of water stress. Not only in rainfed farming but even under irrigated conditions, one will have to plan for the most economic and efficient use of water so as to derive maximum possible benefit from rainfall and reduce dependence on irrigation. This necessitates a close study of the existing cropping patterns vis-a-vis rainfall patterns aimed at determining the nature of changes needed in the former. The cropping patterns depend primarily on the soil and climatic factors but the evolution of a cropping pattern in course of time is the combined effect of soil, climate, food habits and requirements and economic factors. In the context of increasing production, it is necessary to examine the cropping patterns from a scientific angle and find out possible alternative patterns having higher potential. Accordingly, the Commission undertook a comprehensive study of the rainfall and cropping patterns of the country using taluk or tehsil as unit of area. It covered several other relevent factors such as orography, land use data, human and livestock puplations, soil and climate, the object being to make, as far as possible, an integrated assessment.

1.3 Chapter 14 on Rainfall and Cropping Patterns of the Commission's Report presents a consolidated account of the data collected together with analysis of their inter-relationships on all-India basis. In this analysis the Commission has been greatly benefited by the discussions with the concerned officers of State Governments. It was realised that by condensing the vast amount of information collected from each State into the small space of a chapter, many important and peculiar features of individual States were likely to be missed and hence the data and analysis of each State have been presented in separate volumes. The manner of presentation is similar to Chapter 14. It has also been considered desirable to include in each State volume the methodology and suggestions for future cropping patterns, which are practically the same as given in Chapter 14.

## 2 METHODOLOGY

2.1 The chief features of the study are (a) use of taluk or tehsil as unit of area for all basic data and analysis; (b) introduction of coded numerical forms to express patterns of distribution of monthly rainfall throughout the year, crops and livestock; (c) inclusion of information on orography, temperature, evapotranspiration, rainfall, soil, irrigation, land use, human and livestock populations and yield performance of crops, all of which influence in different ways and degrees the cropping patterns of a place and (d) presentation of coded information on rainfall, crops and livestock on 1:1 million scale maps.

### Rainfall Patterns

2.2 A major feature of Indian rainfall is that the southwest monsoon season (June to September) accounts for 70 to 95 per cent of the annual rainfall throughout the country except in the south east peninsula and Kashmir and adjoining hill areas. The monsoon as well as the annual rainfall show large fluctuations from year to year but, as stated in Chapter 13 on Climate and Agriculture, there is no significant evidence of any trend or periodicity in either of them. Considered in relation to crop production, the total

annual or seasonal rainfall does not have much significance and what is important is its distribution during the period of growth of different crops. A relevant question, therefore, is whether rainfall should be examined on a weekly, fortnightly or monthly basis. The coefficient of variation (CV) of monthly rainfall is as high as 40—50 per cent even in the rainiest month of July over most of the central, northern and eastern India. In the south excluding the west coast, CV is higher and varies from 60 to 100 per cent. The variability of weekly or fortnightly rainfall being still greater, makes the use of either of them undependable as indicators of rainfall distribution. For a macro-study like the present, monthly rainfall data which are more dependable and also the most convenient to handle have been used.

2.3 In order to relate crop production with rainfall, certain norms have to be assumed depending on the duration of the crops and their water requirements. On the basis of available information and the fact that most crops mature in about 90 days, the following broad norms have been drawn up :

(i) Rainfall greater than 30 cm per month (cm pm) for at least three consecutive months would be suitable for a crop like paddy whose water need is very high.

(ii) 20—30 cm pm for not less than three consecutive months would be suitable for crops whose water need is high but less than that of paddy, for example, maize and black gram.

(iii) 10—20 cm pm for at least three consecutive months would be suitable for crops requiring much less water, eg, bajra and small millets.

(iv) 5—10 cm pm for three consecutive months would be just sufficient for crops which have low water requirements, eg, *moth* (*P. aconitifolius*) and ephemeral grasses.

(v) Rainfall less than 5 cm pm for three consecutive months is not of much significance for crop production.

2.4 For denoting the year's rainfall distribution using monthly totals, a convenient code in letter symbols with numerical subscripts explained below, has been evolved. The letters A to E in Table 1 indicate the ranges of monthly rainfall and the subscripts to these refer to the number of months having these ranges of rainfall eg. $A_2$ indicates two months with rainfall greater than 30 cm pm. The ranges correspond to those stated in the preceding paragraph.

TABLE 1

Code for Rainfall Data

| Symbol | Monthly rainfall cm pm |
|---|---|
| A+ | Greater than 30 |
| B | 20—30 |
| C | 10—20 |
| D* | 5—10 |
| E* | Less than 5 |

+An examination of monthly rainfall in the country shows that except for areas in the west coast and some hill stations in extreme north-east, normal monthly rainfall seldom exceeds 40 cm.

*In distributions containing ranges of rainfall covered by A or B termed briefly as A&B types amounts less than 10 cm are not so significant and their frequency is generally small. To reduce the number of combinations, D is omitted in A or B type distributions; instead E is used to denote less than 10 cm pm. Thus $B_2E_2$ would denote two months of 20—30 cm pm and two months less than 10 cm pm rainfall.

The southwest monsoon months of June to September being the principal rainy season dominate the rainfall distributions of the country. To indicate the season's importance, monthly rainfall distribution during June to September is shown in brackets in the annual pattern. To the right of the bracket is the distribution for the post-monsoon months, namely, October to January and to the left that for the pre-monsoon months namely, February to May. In order to explain how such a coded rainfall distribution written in symbols with numerical subscripts has to be interpreted, a hypothetical example may be considered, $D_1\ E_3\ (A_2\ B_1)\ C_1\ D_3$, in which for each of the three periods, the symbols are in order of decreasing rainfall which is not necessarily the calendar sequence, can be explained as under :

(i) $D_1E_3$ represents the period February to May in which one month's rainfall (usually May) is in the range of 5—10 and the remaining three months get less than 5 cm pm.

(ii) $A_2\ B_1\ C_1$ represents the period June to September, in which two months (usually July and August) get more than 30 cm pm rainfall, one month (September) gets 20—30 cm and the remaining month, i.e. June gets 10—20 cm.

(iii) $C_1\ D_3$ represents the period October to January in which October gets 10—20 cm rainfall and the rest 5—10 cm pm.

**Boundaries of Rainfall Zones**

2.5 Since differences in monthly, seasonal and annual rainfall are not large within short distances, linear interpolation of rainfall data is permissible. Rainfall data being point measurements, isolines for the same or nearly the same type of distribution of monthly rainfall can, therefore, be drawn. These isolines may not necessarily follow the boundaries of taluks which

are taken to be unit of area in this study and hence for delineation of boundaries the following procedure has been adopted :—

(i) Where variations are small, isolines follow the taluk boundaries;

(ii) where variations are large, isolines delineate the zone boundaries; and

(iii) any taluk, more than three quarters of which lies outside of a zone is not considered a part of that zone.

2.6 If an identical distribution is observed over two or more adjacent taluks a pattern is said to have evolved and the area covered by it is distinguished as a zone and indicated suitably by a Roman numeral. Rainfall patterns have been identified for the whole country using the methodology described above. The data used for the analysis are the monthly normals of rainfall (1901 to 1950)[1] and the patterns and zones are depicted on all-India map which forms part of Chapter 14 on Rainfall and Cropping Patterns of the Commission's Report.

**Cropping Patterns**

2.7 The basic data for the study of cropping patterns of the country are the areas under different crops in each of the taluks. A large number of crops are grown in a taluk but most of them occupy small areas, often less than one per cent of the total cropped areas of the taluk. With a view to limiting the number of crops constituting a pattern only those crops are considered which individually occupy 10 per cent or more of the gross cropped area of the taluk. In this process, several crops have to be excluded, even though they may be otherwise important. The minimum limit has been fixed at 70 per cent, so that the number of crops, which together cover at least 70 per cent of the gross cropped area, and in which none occupies less than 10 per cent, is not large. Trial computations have shown that in such distributions any crop occupying more than 10 per cent area is rarely omitted and the number of crops hardly exceeds five. When the same distribution holds good for two or more adjacent taluks, a pattern is obtained.

2.8 As in the case of rainfall, percentage area coverage by crops is expressed by means of numerical subscripts affixed to crop symbols shown in Table 2. The list of crops given below is comprehensive and will hold good for all the States.

TABLE 2

**Crop Symbols and Area Intervals**

| | Crop | Symbol |
|---|---|---|
| 1 | rice | Pd |
| 2 | wheat | W |
| 3 | jowar (kharif) | Jk |
| 4 | jowar (rabi) | Jr |
| 5 | bajra | B |
| 6 | maize | M |
| 7 | ragi | R |
| 8 | small millets | Mt |
| 9 | barley | Ba |
| 10 | oats | Oa |
| 11 | gram | G |
| 12 | pigeonpea (tur) | T |
| 13 | pulses other than pigeonpea and gram | Pu |
| 14 | groundnut | Gn |
| 15 | oilseeds other than groundnut | O |
| 16 | cotton | C |
| 17 | jute | Ju |
| 18 | other fibres | Fb |
| 19 | sugarcane | S |
| 20 | potato | Pt |
| 21 | vegetables | V |
| 22 | fruits | Fr |
| 23 | tapioca | Te |
| 24 | plantations | L |
| 25 | fodder | F |
| 26 | chillies | Ch |
| 27 | tobacco | To |

| *Area interval (per cent)* | *Subscript* |
|---|---|
| 70 or more | 1 |
| 50—70 | 2 |
| 30—50 | 3 |
| 10—30 | 4 |
| less than 10 | 5 |

The crop code contains the crop symbol and the appropriate subscript. In writing crop distribution, the first crop has always the highest area but the rest may not necessarily follow the order of decreasing areas. For example, crop distribution, $C_3$ $Jr_4$ $Mt_4$, means that cotton area is 30—50 per cent, and jowar rabi and millets each occupies 10—30 per cent of the gross cropped area, the total being 70 per cent or more. Two or more taluks having the same distribution of crops constitute a pattern. Cropping patterns so derived have been indicated on maps of 1 : 1 million size.

**Relative Yield Index of Crops**

2.9 Besides the absolute figures, the yield of a crop has also been expressed as per cent of all-India average which is called Relative Yield Index (RYI). Relative Yield Index values have been computed for the principal crops on the basis of (1968-69 to 1970-71) data available in the records of the Directorate of Economics and Statistics, Ministry of Agriculture and Irrigation.

**Livestock Patterns**

2.10 The livestock patterns are relevant only insofar as these are related to production of fodder and feeds. As talukwise data were not available for the livestock census, 1972, those of 1966 Census as published by the States have been used. The animals considered for livestock analysis are shown in Table 3 together with their symbols.

1. Memoirs of India Meteorological Department, Volume XXXI, Part 3, 1962.

TABLE 3

**Livestock Symbols**

| Category | Symbol |
|---|---|
| cattle | |
| male (over 3 years) | Cm |
| female (over 3 years) | Cf |
| young stock (under 3 years) | Cy |
| buffaloes : | |
| male (over 3 years) | Bm |
| female (over 3 years) | Bf |
| young stock (under 3 years) | Bu |
| sheep | S |
| goats | G |
| horses, mules and ponies | H |
| donkeys | D |
| camels | Ca |
| pigs | P |

The livestock patterns are expressed in coded form in the same manner as the cropping patterns.

**Soils**

2.11 Soil data on a taluk basis are not available for all the areas of the country. As such, soils have been discussed in a general manner using the traditional nomenclature in describing their charateristics.

**Other Data**

2.12 The sources of other data featuring in the study are given below :

| *item* | *source* |
|---|---|
| taluk area | State's Census Reports 1971 or from the data furnished by the State is their land-use returns |
| orography | maps of the Survey of India and National Atlas Organisation |
| temperature | Climatological Tables of Observatories in India, India Meteorological Department, 1931-1960 normals |
| evapotranspiration | scientific Report No. 136 of the India Meteorological Department, 1971 |
| human population | Census of India, 1971 |
| irrigation and land use statistics | basic data pertaining to land utilisation statistics obtained from the States and refer mostly to 1969-70 |

**Presentation of Information**

2.13 The tables required for following the text are given in the text itself at appropriate places, whereas the basic data are appended as follows :

| | |
|---|---|
| APPENDIX 1 | Talukwise Livestock Population—1966 (arranged according to State rainfall zones) |
| APPENDIX 2 | Zonewise Information on Rainfall, Rainy days and Cropping Patterns. |
| APPENDIX 3 | Zonewise Area under Principal Crops |

2.14 Rainfall, cropping and livestock patterns of each State are indicated on maps in the 1 : 1 million scale and given in Appendices 4, 5 and 6 respectively. In the case of rainfall patterns, the zonal number in State maps have been given in Roman numerals and their all-India equivalents as used in Chapter 14 of the Commission's Report have been shown in three digit Arabic numerals within brackets.

## 3 GENERAL FEATURES

3.1 The State has an area of 155,842 sq km, and consists of thirteen districts. The areas of the districts vary from 6,394 sq km (Balasore) to 27,029 sq km (Koraput), the average being 12 thousand sq km.

3.2 Taluk areas range from less than 500 sq km to over 3,000 sq km. About 33 per cent of the taluk areas range from 500 sq km to 1000 sq km, 30 per cent from 1000 to 2000 sq km and the remaining exceed 2000 sq km. The number of taluks in the different area intervals are indicated in Table 4.

TABLE 4

**Number of Taluks in Different Areas Interval**

ORISSA

| district | No of taluks having area in sq km | | | | | | | total no of taluks |
|---|---|---|---|---|---|---|---|---|
| | 250-500 | 501-750 | 751-1000 | 1001-1500 | 1501-2000 | 2001-3000 | 73000 | |
| Balasore | — | 6 | — | 1 | 1 | — | — | 8 |
| Cuttack | 6 | 6 | 4 | 2 | — | — | — | 18 |
| Bolangir | — | — | 1 | 1 | 1 | 2 | — | 5 |
| Dhenkanal | — | — | 1 | 2 | 2 | 2 | — | 7 |
| Ganjam | 1 | — | 4 | 3 | — | 2 | — | 10 |
| Kalahandi | — | — | — | 1 | 1 | 2 | 1 | 5 |
| Keonjhar | — | 1 | 1 | 1 | 1 | — | 1 | 5 |
| Koraput | — | 2 | — | — | 5 | 4 | 2 | 13 |
| Mayurbhanj | — | — | 1 | 1 | 1 | — | 2 | 5 |
| Phulbani | — | — | — | 1 | — | 1 | 2 | 4 |
| Puri | 1 | 2 | 5 | 3 | — | — | — | 11 |
| Sambalpur | — | — | — | — | — | 6 | 1 | 7 |
| Sundargarh | — | — | — | 2 | 2 | — | 1 | 5 |
| TOTAL | 8 | 17 | 17 | 18 | 14 | 19 | 10 | 103 |

**Elevation**

3.3 The State is broadly divided into four regions viz. the northern plateau, central river basins, the eastern hills and the coastal plains. The main features of these regions are as under :

(a) The northern plateau region includes mainly Mayurbhanj, Keonjhar and Sundargarh districts. This is an undulating upland frequently intersected by hill ranges and sloping from north to south. The average elevation in the central section of the plateau is 900 masl (metres above sea level).

(b) The central river basins lie between the northern plateau and the eastern hills and include the districts of Bolangir, Sambalpur and Dhenkenal.

(c) The eastern hills which constitute the last lap of the Eastern Ghats, lie to the south and southwest of the central river basins stretching for about 250 in NE-SW direction through Koraput, Kalahandi and Ganjam. The eastern hills are elevated and are generally over 900 masl.

(d) The coastal plains comprise mostly of Balasore, Cuttack, Puri and a portion of Ganjam district.

Summing up, the areas of the State north of lat. 20° have elevations of up to 500 masl in general, and in the southwestern districts, they rise to 1500-1600 masl.

**Population**

3.4 The total population of the State is 21.94 million, with an average population density of 141 per sq km. The coastal districts have the highest population density with Cuttack having a population density of 341. Phulbani district has the lowest population density of 56. Urban population in the State is very low, hardly 9 per cent of total. The population density in taluks shows large variations ranging from 25 in Motu taluk, to 766 in Berhampur. Table 5 shows the districtwise density of population and the frequency distribution of taluks according to population density.

TABLE 5

**Frequency of Taluks in Different Ranges of Population Density**

ORISSA

| district | district density per sq km | No of Taluks with population density (per sq km) | | | | | | | | total no. of taluks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 50 | 51-100 | 101-150 | 151-200 | 201-300 | 301-400 | 401-500 | 7500 | |
| Balasore | 286 | — | — | — | 1 | 5 | 2 | — | — | 8 |
| Cuttack | 341 | — | — | — | 2 | 4 | 4 | 5 | 2 | 18 |
| Puri | 230 | 1 | 1 | — | 2 | 4 | 2 | 1 | — | 11 |
| Ganjam | 183 | — | 1 | 3 | 3 | 2 | — | — | 1 | 10 |
| Mayurbhanj | 138 | — | 1 | 1 | 2 | 1 | — | — | — | 5 |
| Keonjhar | 116 | — | 2 | 1 | 2 | — | — | — | — | 5 |
| Sundargarh | 107 | — | 2 | 2 | — | 1 | — | — | — | 5 |
| Sambalpur | 105 | 1 | 2 | 3 | 1 | — | — | — | — | 7 |
| Bolangir | 142 | — | — | 3 | 2 | — | — | — | — | 5 |
| Dhenkanal | 120 | — | 2 | — | 4 | 1 | — | — | — | 7 |
| Kalahandi | 98 | — | 3 | 2 | — | — | — | — | — | 5 |
| Koraput | 76 | 1 | 9 | 3 | — | — | — | — | — | 13 |
| Phulbani | 56 | 1 | 3 | — | — | — | — | — | — | 4 |
| STATE total | 141 | 4 | 26 | 19 | 19 | 18 | 8 | 6 | 3 | 103 |

**Land Use**

3.5 On a State basis forests account for 32 per cent of the area and 12 per cent of land is not available for cultivation. Fallow lands, cultivable waste and permanent pastures occupy 15 per cent of area. In view of the large area under forests and land not available for cultivation, the net sown area is considerably reduced and accounts for only 39 per cent of the total geographical area of the State. The areas under forests, fallow lands and net sown area vary from district to district. Forest areas range from 7.6 per

cent to 68.9 per cent, fallow lands from 0.6 per cent to 9 per cent and net sown area from 8.3 to 70 per cent. The percentage of area under different items of land use are indicated in Table 6.

TABLE 6

**Land Use Statistics—1969-70**

ORISSA

(Per cent of reporting area)

| district | forests | misc. trees crops & groves not included in net sown area | permanent pastures & other grazing lands | cultivable waste | not available for cultivation | fallow land | net area sown |
|---|---|---|---|---|---|---|---|
| Balasore | 15·4 | 1·5 | 3·3 | 0·6 | 6·5 | 2·8 | 70.0 |
| Bolangir | 18·5 | 1·8 | 6·8 | 5·2 | 8·1 | 5·4 | 54.3 |
| Cuttack | 7·6 | 2·4 | 5·8 | 4·3 | 13·2 | 3·9 | 62 8 |
| Dhenkanal | 27·2 | 1·9 | 4·7 | 9·3 | 17·1 | 2·7 | 37.1 |
| Ganjam | 32·7 | 5·1 | 4·6 | 4·7 | 11·8 | 6·0 | 30.0 |
| Kalahandi | 46·6 | — | 5·1 | 3·5 | 5·0 | 7·3 | 32.4 |
| Keonjhar | 42·0 | 0·8 | 4·5 | 3·3 | 5·1 | 9·0 | 35.2 |
| Koraput | 17·0 | 7·7 | 5·1 | 12·2 | 23·7 | 1·9 | 32.4 |
| Mayurbhanj | 33·3 | 0·8 | 5·5 | 3·2 | 11·0 | 4·4 | 41.7 |
| Phulbani | 68·9 | 1·4 | 2·1 | 1·7 | 7·1 | 0·6 | 18.3 |
| Puri | 27·8 | 2·2 | 5·5 | 5·9 | 12·7 | 3·3 | 42.5 |
| Sambalpur | 48·6 | 0·6 | 3·3 | 1·4 | 5·3 | 7·2 | 41.5 |
| Sundargarh | 47·2 | 2·0 | 4·3 | 1·6 | 5·7 | 8·9 | 30.2 |
| STATE total | 31·9 | 2·8 | 4·7 | 5·2 | 11·6 | 4·7 | 39.2 |

## Soils

3.6 Five main soil types, viz red and yellow, red sandy, red loamy, laterite, coastal or deltaic alluvium, have been distinguished in the State. The areas covered by the different soil types are given below :

(a) Small areas or pockets of laterite are present in Cuttack, Puri, Ganjam and Koraput districts. Coastal or deltaic alluvium is a narrow coastal strip except in Balasore and Cuttack where the area under deltaic alluvium is larger.

(b) Red and yellow soils cover the western half of the State except for the central belt of red sandy soils in the belt including eastern half of Bolangir, Central Sambalpur and eastern half of Sundārgarh. Red and sandy soils cover almost entirely the northern district of Mayurbhanj.

(c) Ganjam district has mainly red sandy soils with a pocket of laterite and red loamy soils in the north. In the rest of the State red loamy soils prevail with pockets of laterite.

## Crops Statistics

3.7 Crop data were originally received for blocks in the different districts. As the unit of area for crop analysis is the taluk, the blocks were grouped under the respective taluks and the areas of crops in each taluk were accordingly worked out. These form the basic crop data for analysis of the cropping structure of the State. The gross cropped area of the State calculated from block data differs from the total of the district areas given in land use statement. This may not, however, affect the analysis as the percentages of area under crops to gross cropped area is only needed.

## Irrigation

3.8 In 1969-70, about a million hectares were irrigated representing 17 per cent of net sown area. The per cent of net sown area irrigated in the districts is given in Table 7.

TABLE 7

**Per cent of Net Sown Area Irrigated—1969-70**

ORISSA

| district | irrigated area as per cent of net sown area |
|---|---|
| Cuttack | 40 |
| Ganjam | 39 |
| Puri | 31 |
| Sambalpur | 19 |
| Phulbani | 16 |
| Bolangir | 15 |
| Balasore | 12 |
| Dhenkanal | 10 |
| Mayurbhanj | 8 |
| Sundargarh | 6 |
| Kalahandi | 6 |
| Keonjhar | 4 |
| Koraput | 3 |

## Rainfall

3.9 The annual rainfall of Orissa is 148 cm in 72 rainy days. June to September is the rainiest period accounting for more than 75 per cent of annual rainfall. Monthly and annual rainfall and variability are shown below :

| | *Jan* | *Feb* | *Ma* | *Apr* | *May* | *June* | *July* | *Aug* | *Sept* | *Oct* | *Nov* | *Dec* | *Annual* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| rainfall (mm) | 14 | 26 | 21 | 35 | 71 | 213 | 352 | 336 | 237 | 132 | 40 | 6 | 1482 |
| rainy days | 0·9 | 1·6 | 1·5 | 2·5 | 4·4 | 10·1 | 15·6 | 15·5 | 12·1 | 6·1 | 1·6 | 0·4 | 72·3 |
| Coefficient of Variation (CV) | 121 | 104 | 106 | 77 | 55 | 42 | 26 | 24 | 22 | 65 | 135 | 220 | 11 |

3.10 The northern districts of the State receive maximum rainfall during July and the rest of the State in August except in portions of Ganjam district, where September is generally the month of maximum rainfall. Rainfall in June ranges from 20 to 25 cm except in Ganjam where it ranges from 15 to 20 cm. Rainfall in July is more, being 30 to 50 cm except in Ganjam and neighbourhood where it is 20 to 30 cm only. August rainfall is nearly similar to July. September rainfall amount is lower and ranges from 20 to 30 cm. October rainfall varies from 20 cm along the coast to 5 to 7.5 cm in the west. In November, the rainfall ranges from 7.5 to 10 cm along the coastal belt to less than 2.5 cm in the west. December and January are parctically rainless months. The annual total rainfall varies from 120 cm along Ganjam Coast and neighbourhood to 160-170 cm in the Southwest part of Koraput district and generally in the northern districts of Sambalpur, Sundargarh, Keonjhar, Mayurbhanj and Balasore.

**Rainfall Variability**

3.11 The Coefficient of variation (CV) during February-March exceeds 100 and ranges between 80 to 100 in April and May. June CV is about 60 in the western half and along the coast and 40-50 elsewhere. July CV is 50 along coast, 40 to 50 in the north eastern districts and less than 40 in the remaining parts. August CV is nearly similar and less than 40 excluding eastern areas where it is from 40 to 50. It may be mentioned that CV of August for the whole State is 27 as against 29 for July though the rainfall of July is higher than August by 1 cm. September CV is 40 to 50 except in the north eastern areas where it is less than 40.

**Temperature**

3.12 Normals of maximum, minimum and mean daily temperatures which are recorded by nine observatory stations in the State are given in Tables 8, 9 and 10. Some of the important features of the temperature are described below :

(i) December and January are the coldest months of the year with averages of 12 to 15°C except at coastal stations of Puri and Gopalpur which range between 17 to 18°C. Minimum averages in May and June are the highest with 27-28°C, followed by July to September with 24 to 26°C.

(ii) The maximum temperature of 27°C during December and January, rises to 35°C by March except at coastal stations where maximum is about 30-31°C. May is the hottest month with 40°C to 42°C.

(iii) Mean daily temperature averages 20 to 22°C in December and January and arises to 30 to 32°C by April and 35°C by May. June averages are lower and during July to September there is very little of monthly variation.

TABLE 8

**Normals of Daily Maximum Temperature (°C)**

| Station | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Angul | 27·7 | 30·5 | 35·2 | 38·9 | 40·3 | 36·3 | 31·2 | 31·1 | 31·6 | 31·0 | 28·7 | 26·9 | 32·5 |
| 2. Balasore | 27·1 | 29·5 | 33·9 | 36·2 | 36·4 | 34·3 | 31.3 | 31·2 | 31·3 | 30·8 | 28·8 | 26·9 | 31·5 |
| 3. Chandbali | 27·0 | 29·9 | 33·9 | 36·4 | 36·4 | 34·3 | 31·4 | 31·3 | 31·5 | 30·8 | 28·8 | 26·9 | 31·6 |
| 4. Cuttack | 28·9 | 31·5 | 35·9 | 38·3 | 38·8 | 35·8 | 31·6 | 31·6 | 32·2 | 32·0 | 30·1 | 28·4 | 32·9 |
| 5. Gopalpur | 27·4 | 28·9 | 30·6 | 31·1 | 32·1 | 32·2 | 30·8 | 31·1 | 31·6 | 31·1 | 29·3 | 27·5 | 30·2 |
| 6. Puri | 26·9 | 28·3 | 30·0 | 30·7 | 31·6 | 31·7 | 30·6 | 31·0 | 31.4 | 31·2 | 29·3 | 27·2 | 31·8 |
| 7. Sambalpur | 28·2 | 30·5 | 35·4 | 39·6 | 42.1 | 37·2 | 30·7 | 30·7 | 31·5 | 31·5 | 29·3 | 27·7 | 31·9 |
| 8. Titlagarh | 28·7 | 32·3 | 36·0 | 39·3 | 41.5 | 36·9 | 31·1 | 30·4 | 31·1 | 31·4 | 29·2 | 28·1 | 33·0 |
| 9. Koraput | 25·2 | 28·2 | 31·6 | 33·6 | 24·1 | 30·4 | 25·5 | 25·2 | 26·3 | 26·8 | 25·4 | 24·5 | 28·1 |

TABLE 9

**Normals of Daily Minimum Temperature (°C)**

| Station | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Angul | 13·8 | 16·3 | 20·4 | 24·9 | 26·8 | 26·5 | 25·2 | 25·1 | 24·9 | 22·5 | 17·6 | 13.4 | 21.5 |
| 2. Balasore | 14·1 | 16·8 | 21·3 | 24·8 | 26·7 | 26·6 | 26·1 | 26·1 | 25·8 | 23·4 | 17·7 | 14·1 | 22·0 |
| 3. Chandbali | 14·8 | 17·5 | 21·6 | 25·0 | 26·6 | 26·3 | 25·7 | 25·9 | 25·7 | 23·6 | 18·4 | 14·7 | 22·2 |
| 4. Cuttack | 15·7 | 18·2 | 22·1 | 25·3 | 26·9 | 26·5 | 25·6 | 25·6 | 25·5 | 23·7 | 18·8 | 15·5 | 22·5 |
| 5. Gopalpur | 16·9 | 19·4 | 22·6 | 25·1 | 26·8 | 26·9 | 26·1 | 26·1 | 25·8 | 23·9 | 19·5 | 16·6 | 23·0 |
| 6. Puri | 17·9 | 20·8 | 24·6 | 26·6 | 27·7 | 27·4 | 26·7 | 26·8 | 26·6 | 25·0 | 20·8 | 17·7 | 24·1 |
| 7. Sambalpur | 12·6 | 14·9 | 18·7 | 23·8 | 27·6 | 26·9 | 24·9 | 24·9 | 24·8 | 22·0 | 15·8 | 12.2 | 20·8 |
| 8. Titlagarh | 13·7 | 16·5 | 20·4 | 25·3 | 27·9 | 26·7 | 24·4 | 24·4 | 24·2 | 22·3 | 16·2 | 13·2 | 21·3 |
| 9. Koraput | 12·0 | 14·1 | 17·6 | 20·7 | 22·6 | 22·3 | 20·4 | 20·2 | 20·1 | 10·5 | 13·7 | 11·3 | 17·8 |

TABLE 10

**Normals of Mean Daily Temperature (°C)**

| Station | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Balasore | 20·6 | 23·2 | 27·6 | 30·5 | 31·6 | 30·5 | 28·7 | 28·7 | 28·6 | 27·1 | 23·3 | 20·5 | 26·0 |
| 2 Sambalpur | 20·4 | 22·7 | 27·1 | 31.7 | 24·9 | 32·1 | 27·8 | 27·8 | 28·2 | 26·8 | 22·6 | 20·0 | 26·9 |
| 3 Angul | 20·8 | 23·4 | 27·8 | 31·9 | 33·6 | 31·4 | 28·2 | 28·1 | 28·3 | 26·8 | 23·2 | 20·3 | 27·0 |
| 4 Chandbali | 20·9 | 23·7 | 27·8 | 30·7 | 31·5 | 30·3 | 28·6 | 28·6 | 28·6 | 27·2 | 23·6 | 20·8 | 26·9 |
| 5 Cuttack | 22·3 | 24·9 | 29·0 | 31·8 | 32·9 | 31·2 | 28·6 | 26·6 | 28·9 | 27·9 | 24·5 | 22·0 | 27·7 |
| 6 Tidagarh | 21·2 | 24.4 | 28·2 | 32·3 | 34·7 | 31·8 | 27·8 | 27·4 | 27·7 | 26·9 | 22·7 | 20·7 | 27·2 |
| 7 Puri | 22·4 | 24·6 | 27·3 | 28·7 | 29·7 | 29·6 | 28·6 | 28·9 | 29·0 | 28·1 | 25·1 | 22·5 | 27·1 |
| 8 Gopalpur | 22·2 | 24·2 | 26·6 | 28·1 | 29·5 | 29·6 | 28·5 | 28·6 | 28·7 | 27·5 | 24·4 | 22·1 | 26·7 |
| 9 Koraput | 18·6 | 21·2 | 24·6 | 27·2 | 28·4 | 26·4 | 23·0 | 22·7 | 23·2 | 22·7 | 19·6 | 17·9 | 23·0 |

**Potential Evapotranspiration (PE)**

3.13 Monthly and annual values of PE for 9 observatory stations are given in Table 11. PE is lowest in the winter months being 8 to 10 cm increasing to 17-19 cm by April and to 20 cm in May. With the onset of monsoon, PE decreases and the values from July to September are 10 to 13 cm pm. The annual PE is 150 to 160 cm except in Puri and Gopalpur whose values are about 170 cm. July and August PE values are mostly a third of the rainfall of these months. September rainfall is generally higher than PE. In some areas October PE is less than the months' rainfall, though in general PE is greater.

TABLE 11

**Normal Monthly and Annual Potential Evapotranspiration (PE) (mm)**

| Station | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec. | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Balasore | 82·0 | 102·3 | 156·5 | 177·3 | 218·5 | 129·4 | 106·8 | 100·9 | 94·1 | 104·6 | 88·2 | 76·3 | 1437·4 |
| 2 Sambalpur | 80·4 | 99·2 | 147·6 | 179·0 | 205·0 | 156·2 | 105·2 | 102·5 | 103·9 | 113·0 | 87·2 | 72·8 | 1452·3 |
| 3 Angul | 90·5 | 110·8 | 162·8 | 187·7 | 216·2 | 152·4 | 112·7 | 110·7 | 106·4 | 112·1 | 94·7 | 82·4 | 1539·9 |
| 4 Chandbali | 88.2 | 1 1.0 | 163.2 | 194.2 | 243.1 | 147.6 | 122.3 | 124.2 | 115.8 | 115.3 | 95.9 | 82·0 | 1602·5 |
| 5 Cuttack | 87·9 | 106·1 | 157·5 | 179·7 | 202·9 | 143·5 | 112·7 | 110·7 | 109·8 | 115·0 | 95·3 | 80·7 | 1502·4 |
| 6 Tidagarh | 84·6 | 104·5 | 149·1 | 175·9 | 190·5 | 162·3 | 122·2 | 113·5 | 112·0 | 114·4 | 90·1 | 77·4 | 1496.9 |
| 7 Puri | 109·4 | 127·8 | 169·7 | 168·3 | 257·1 | 143·4 | 135·5 | 134·6 | 130·5 | 133·3 | 115·5 | 104·4 | 1730·0 |
| 8 Gopalpur | 103·0 | 120·7 | 167·7 | 170·6 | 258·4 | 140·9 | 120·9 | 124·6 | 120·1 | 123·6 | 111·0 | 98·7 | 1600·0 |

**Climatic Classification**

3.14 Puri and Gopalpur coastal areas are dry sub-humid. Rest of the State is mostly moist sub-humid.

## 4 RAINFALL ZONES, THEIR CROPPING AND LIVESTOCK PATTERNS

4.1 The State is divided into 12 rainfall zones. These are indicated below together with the number of taluks included in each and their total approximated area :

| *rainfall zone no* | *rainfall pattern* | *no. of taluks* | *area (sq km)* |
|---|---|---|---|
| I | $E_4 (A_2 B_2) D_1 E_3$ | 24 | 51885 |
| II | $D_1 E_3 (C_4) C_1 D_1 E_2$ | 1 | 767 |
| III | $D_1 E_3 (B_3 C_1) C_1 E_3$ | 3 | 6079 |
| IV | $D_1 E_3 (B_3 C_1) C_1 D_1 E_2$ | 11 | 12592 |
| V | $D_1 E_3 (B_4) C_1 E_3$ | 3 | 2827 |
| VI | $D_1 E_3 (A_1 B_3) C_1 E_3$ | 6 | 3508 |
| VII | $D_1 E_3 (A_2 B_2) D_1 E_3$ | 17 | 33376 |
| VIII | $D_1 E_3 (A_2 B_2) C_1 E_3$ | 17 | 18309 |
| IX | $D_1 E_3 (A_2 B_2) C_1 D_1 E_2$ | 7 | 4894 |
| X | $D_1 E_3 (A_3 B_1) C_1 E_3$ | 3 | 7768 |
| XI | $D_2 E_2 (B_4) C_1 D_1 E_2$ | 2 | 3304 |
| XII | $C_1 D_1 E_2 (A_2 B_2) C_1 E_3$ | 528 | 109 |

4.2 In terms of area as also taluks, Zone I is the biggest occupying a third of the total area of the State. Zones VII and VIII are the next largest and the patterns of these two zones are same except for higher rain in October in Zone VII. These two account for a third of the total area and a third of the taluks. Zone XII has nearly similar distribution and covers about 7 per cent area. Zones I, VII, VIII and XII have the same distribution patterns $A_2$ $B_2$ for the monsoon season and include nearly three fourth of the total area of State.

**Rainfall Zone I—$E_4$ ($A_2$ $B_2$) $D_1$ $E_3$**

4.3 The districts, taluks and cropping patterns included in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_1$ | Sudargarh | Sundargarh |
| | Rajgangpur | ,, |
| | Hemgir | ,, |
| | Kurmunda | ,, |
| | Bonai | ,, |
| | Sambalpur | Sambalpur |
| | Jharsuguda | ,, |
| | Bargarh | ,, |
| | Padampur | ,, |
| | Rairakhol | ,, |
| | Deogarh | ,, |
| | Kuchinda | ,, |
| $Pd_2$ $Pu_4$ | Athmalik | Dhenkanal |
| $Pd_1$ | Baudh | Phulbani |
| $Pd_2$ $Pu_4$ | Bolangir | Bolangir |
| $Pd_1$ | Sonepur | ,, |
| ,, | Birmaharajpur | ,, |
| $Pd_2$ $Pu_4$ | Patangarh | ,, |
| | Titlagarh | ,, |
| $Pd_2$ $Mt_4$ | Kalahandi | Kalahandi |
| $Pd_2$ $Pu_4$ | Dharamgarh | ,, |
| $Pd_2$ $Pu_4$ | Jaipatna | ,, |
| $Pd_2$ $Mt_4$ | Nawapara | ,, |
| $Pd_4$ $O_4$ $M_4$ $R_4$ | Kashipur | Koraput |

4.4 The zone is the biggest occupying about a third of the area of the State. It comprises 24 taluks spread over seven districts. The areas of taluks vary from 896 to 3445 sq km. The average area of a taluk being 2000 sq km. Thirteen of the 24 taluks exceed 2000 sq km in area and four range between 3140 and 3450 sq km. The population density is rather low. About half the taluks have population density of less than 100 per sq km and only in one taluk population density exceeds 200.

4.5 About forty to fifty per cent of the area in Sundargarh, Kalahandi and Sambalpur districts is under forests, whereas it is below 20 per cent in Bolangir. Land not available for cultivation ranges from 5 to 8 per cent and fallow lands are between 5 to 10 per cent. Net sown area is around 30 per cent in Sundargarh and Kalahandi, 40 per cent in Sambalpur and 55 per cent in Bolangir district.

4.6 Soils are red and yellow in most of the districts with red sandy soils in the rest of the area. About 15 to 20 per cent of net sown area is irrigated in Sambalpur and Bolagir districts and is negligible elsewhere.

4.7 The annual average rainfall of the zone is 150 cm in 70 rainy days. July and August which get more than 30 cm pm account for 55 per cent of annual. June and September are in 20-30 cm class.

4.8 Paddy is the principal crop of the zone and in 15 of the 24 taluks it occupies an area of 70 per cent. The above 15 taluks cover the entire districts of Sundargarh and Sambalpur, and Baudh, Sonepur and Birmaharajpur taluks. Except for Kashipur the rest of the taluks in the Zone have paddy area higher than 50 per cent. Kashipur has small but significant areas under paddy followed by maize (12 per cent) ragi (16 per cent) and other oil seeds (23 per cent). The zone has three patterns $Pd_1$ $Pd_2$ $Pu_4$ $Mt_4$ and $Pd_4$ $O_4$ $M_4$ $R_4$.

4.9 The yield of crops in Sundargarh, Sambalpur and Balangir districts and most of Kalahandi district are considered here and the Relative Yield Index of crops are given in Table 12. The yield of rice is much below all-India level and also lower than the State average.

4.10 This zone has the largest number of male cattle constituting 27 per cent of the total livestock. Female & Young stock Cattle, and goats account for about 18 per cent each. The zone has five livestock patterns and the taluks under each of these is shown below :

| | |
|---|---|
| Kashipur, Kalahandi, Dharamgarh, Jaipatna, Nawapara, Bolangir, Sonepur, Patangarh, Titlagarh, Rairakhol | $Cm_4$ $G_4$ $Cf_4$ $Cy_4/S_4/Bn_4$ |
| Birmaharajpur, Sambalpur, Jharsuguda, Bargarh, Padampur, Deogarh | $Cm_4$ $Cf_4$ $Cy_4/G_4$ |
| Athonalik, Baludh | $G_4$ $Cm_4$ $Cf_4$ $Cy_4$ |
| Sundargarh, Hemgir, Pannpost, Bonai | $G_4$ $Cm_4$ $Cf_4/Cf_4$ $Cy_4$ |
| Rajgangpur | $Cy_3$ $Cm_4$ $G_4$ |

TABLE 12

**Relative Yield Index of Principal Crops in Zone I**
(All-India average yield = 100)

| District | rice | total pulses |
|---|---|---|
| Sundargarh | 70 | 62 |
| Sambalpur | 81 | 128 |
| Bolangir | 81 | 89 |
| Kalahandi | 71 | 105 |

**Rainfall Zone II—$D_1$ $E_3$ ($C_4$) $C_1$ $D_1$ $E_2$**

4.11 This zone includes only Chatarpur taluk of Ganjam district and has a cropping pattern as $Pd_2$ P.

4.12 The area of the zone is 767 sq km and has a population density of 390 per sq km.

4.13 The annual rainfall is about 120 cm in 56 rainy days. September is the month of maximum rainfall but all months from June to October receive more than 10 cm pm.

4.14 Paddy covers 51 per cent of the cropped area followed by other pulses 21 per cent, gram and ragi each 7 per cent. The cropping pattern for the zone is $Pd_2$ $Pu_4$.

4.15 Male cattle constitute about 30 per cent of the livestock population, followed by female cattle 24 per cent, young stock cattle and goats 18 and 19 per cent respectively. The livestock pattern is :

$Cm_4$ $Cf_4$ $Cy_4/G_4$

**Rainfall Zone III—$D_1$ $E_3$ ($B_3$ $C_1$) $C_1$ $E_3$**

4.16 The district, taluk and the cropping patterns included in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_3$ $Pu_4$ $Mt_4$ | Gunupur | Koraput |
| $Pd_3$ $O_4$ $R_4$ $Mt_5$ | Bissamcuttack | ,, |
| $Pd_4$ $R_4$ $O_4$ $Pu_4$ $Mt_5$ | Rayagada | ,, |

4.17 The area of the zone is 6079 sq km and the areas of taluks vary between 1546 and 2725 sq km. This is a zone of low population with population density ranging between 60 and 100 per sq km. Soils are red loamy with laterite patches.

4.18 The annual rainfall is above 120 cm in 70 rainy days. August is the month of maximum and together with July accounts for 40 per cent of the total rainfall. July to September rainfall is higher than 20 cm pm.

4.19 Though paddy is the dominant crop in this zone, other crops such as ragi, millets and other pulses are also grown, there are three cropping patterns.

4.20 Though rice is the dominant crop the average yield is also 80 per cent only of all-India average. Yield of ragi, pulses and small millets is good and close to all-India level.

4.21 Male cattle account for 23 to 26 per cent of the livestock population, with female & youngstock cattle and goats constituting 15 to 20 per cent. The pattern is $Cm_4$ $G_4$ $Cf_4$ $Cy_4/Bm_4$.

**Rainfall Zone IV—$D_1$ $E_3$ ($B_2$ $C_1$) $C_1$ $D_1$ $E_3$**

4.22 The districts, taluks and the cropping patterns included in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_3$ $O_4$ $M_4$ $Mt_4$ | G. Udayagiri | Phulbani |
| $Pd_2$ $Pu_4$ | Ghumusar | Ganjam |
| $Pd_3$ $Pu_3$ | Aska | ,, |
| $Pd_2$ $Pu_4$ | Digapahandi | ,, |
| | Chikiti | ,, |
| | Berhampur | ,, |
| | Kodala | ,, |
| $Pd_3$ $Pu_4$ $R_4$ | Parlakhempundi | ,, |
| $Pd_2$ $Pu_4$ | Puri | Puri |
| $Pd_1$ | Banpur | ,, |
| | Krishna Prasad | ,, |

4.23 The area of the zone is 12,592 sq km and covers 11 taluks located in Ganjam, Phulbani and Puri districts. Berhampur taluk is the smallest with an area of 394 sq km and Ghumusar the largest with an area of 2127 sq km. The zone is well populated except for Krishna Prasad taluk which has a very low population density of 34 per sq km. Berhampur is density populated with a density of 766, the highest in the whole state.

4.24 Ganjam district has one third of its reporting area under forests and 12 per cent under land not available for cultivation. Fallow lands, cultivable waste, permanent pastures and miscellaneous trees etc. are each 5 to 6 per cent of the reporting area. Net sown area is 30 per cent of total area. In Puri district the net sown area is about 42 per cent.

4.25 Soils are red sandy with coastal alluvium and with a significant patch of laterite in the west.

4.26 The annual rainfall varies between 120 to 140 cm in general. The month of maximum rainfall is either August or September. All the months from June to October get more than 10 cm pm.

4.27 This is a zone with about 60 per cent area under paddy and 23 per cent under other pulses.

4.28 The yield of rice in Ganjam district is 90 per cent of all-India level, whereas it is 94 per cent in Puri district. Yield of total pulses in Ganjam district is 89 per cent. Yield of maize is same as all-India yield and that of small millets one and half terms of all-India average.

4.29 Male cattle constitute 27 per cent of total livestock Female cattle and Youngstock cattle account for 23 and 19 per cent respectively. The zonal pattern is simply $Cm_4$ $Cf_4$ $Cy_4$.

**Rainfall Zone V—$D_1$ $E_3$ ($B_4$) $C_1$ $E_3$**

4.30 The districts taluks and the cropping patterns in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_1$ | Jaleswar | Balasore |
| $Pd_1$ | Basta | ,, |
| $Pd_2$ $Pu_4/G_4$ | Nayagarh | Puri |

4.31 The area of the zone is 2827 sq km. The two taluks of Balasore district are each about 700 sq km only. The population density of Jaleswar and Basta is high being in the range of 300 to 365 per sq km while that of Nayagarh is lower being 192.

4.32 Fifteen per cent of area in Balasore district is under forests and 7 per cent of area is not available for cultivation. Net sown area is 70 per cent of the reporting area.

4.33 The annual rainfall is 135 cm in 75 rainy days. July and August are the rainiest months contributing 40 per cent of annual. All the months from June to September receive 20—30 cm pm.

4.34 Paddy is the dominant crop occupying 79 per cent of the cropped area.

4.35 Male, female and young stock cattle account for 70 per cent of the livestock population. The livestock patterns are :

| | |
|---|---|
| Jaleswar, Basta | $Cm_3$ $Cf_4$ $Cy_4/G_4$ |
| Nayagarh | $Cm_4$ $Cf_4$ $Cy_4$ |

**Rainfall Zone VI—$D_1$ $E_3$ ($A_1$ $B_3$) $C_1$ $E_3$**

4.36 The district, taluks and the cropping patterns included in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_1$ | Kujang | Cuttack |
| | Kendrapora | ,, |
| | Kanika | ,, |
| | Pattamundai | ,, |
| | Marsaghai | ,, |
| $Pd_2$ $Pu_4$ | Aul | ,, |

4.37 The total area of the zone is 3508 sq km and the areas of taluks range from 295 to 1013 sq km. The zone is densely populated with a population density ranging from 300 to 400 per sq km.

4.38 Land not available for cultivation in 13 per cent of the reporting area in Cuttack district and the net sown area in the district is 63 per cent.

4.39 Soils are mainly laterite in the zone, and 40 per cent of net sown area is irrigated.

4.40 The annual average rainfall is over 150 cm in 70 rainy days. July is the month of maximum rainfall and together with August accounts for 40 per cent of annual rainfall. Only July receives more than 40 per cent of annual rainfall and the other months June, August and September get 20—30 cm pm.

4.41 Paddy occupies 64 per cent of cropped area in Aul and 67 to 84 per cent in the other taluks. The pattern is $Pd_2$ $Pu_4$.

4.42 Rice yield in Cuttack district is only 88 per cent of all-India level.

4.43 Cattle constitute 80 per cent of total live Stock. The patterns are :

| | |
|---|---|
| Aul | $Cf_3\ Cy_4\ Cm_4$ |
| Kanika | $Cy_4\ Cm_4\ Cf_4$ |
| Kujang, Kendrapara, Pattamundai, Marsaghai | $Cm_3\ Cf_4\ Cy_4$ |

**Rainfall Zone VII—$D_1\ E_3\ (A_2\ B_2)\ D_1\ E_3$**

4.44 The districts, taluks and the cropping pattern in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_1$ | Barbil | Keonjhar |
| | Keonjhar | ,, |
| | Champua | ,, |
| | Kanjipani | ,, |
| $Pd_2\ M_2$ | Angul | Dhenkanal |
| $Pd_1$ | Talchar | ,, |
| | Pallahara | ,, |
| | Dhenkanal | ,, |
| | Kamakhyanagar | ,, |
| $Pd_4\ O_4\ R_4\ Mt_4\ Pu_4$ | Koraput | Koraput |
| $R_4\ O_4\ Pd_4\ Mt_4/T_4$ | Nandapur (Pottangi) | ,, |
| $Pd_4\ O_4\ R_4\ Pu_4$ | Boriguma | ,, |
| $Pd_2\ O_4$ | Kotpad | ,, |
| | Nowrangapur | ,, |
| $Pd_2\ Pu_4\ O_5$ | Umarkot | ,, |
| $Pd_3\ Pu_4\ O_5\ Mt_5$ | Khendrmals | Phulbani |
| $Pd_3\ O_4\ Mt_4\ M_4$ | Balliguda | ,, |

4.45 The area of the zone is 33,376 sq km and accounts for more than 20 per cent of the geographical area of the State. The areas of taluks are large, with 50 per cent of them being greater than 2000 sq km. Nearly fifty per cent of the taluks have population density between 100 and 200 per sq km and rest between 37 and 100.

4.46 Area under forest is 42 per cent of the total reporting area in Keonjhar, 27 per cent in Dhenkanal, 17 per cent in Koraput and 69 per cent in Phulbani districts. The net sown area ranges from 18 per cent in Phulbani district to 37 per cent in Dhenkanal district.

4.47 Soils are usually red loamy in the eastern region and red and yellow in the western region. Area under irrigation covers 10 to 16 per cent of net sown area in Dhenkanal and Phulbani districts and negligible elsewhere.

4.48 Annual rainfall is about 150 cm, with maximum rainfall in July. July and August contribute 50 per cent to total and receive more than 30 cm pm whereas June and September get 20—30 cm pm rainfall.

4.49 This is a zone where paddy is the main crop, but crops like maize, small millets, other pulses, other oilseeds and ragi have also significant areas and enter into cropping patterns. Pottangi is the only taluk having the highest proportion of cropped area under ragi.

4.50 The Relative Yield Index Values of Crops are given in Table 13. The yield of paddy in the zone is less than the all-India average. Yield of maize is much lower than all-India and ragi yields are about all-India level.

4.51 Male cattle constitute about 30 per cent of livestock population in a number of taluks. The livestock patterns are :

| *patterns* | *taluks* |
|---|---|
| $Cm_3\ Cf_4\ G_4/Cy_4$ | Barbil<br>Champua<br>Keonjhar<br>Kamakhyanagar<br>Talchar |
| $Cm_4\ Cf_4\ Cy_4$ | Dhenkanal |
| $Cm_4\ G_4\ Cf_4\ Cy_4/S_4/Bm_4$ | Koraput<br>Nandapur<br>Boriguma<br>Kotpad<br>Nowrangapur<br>Angul |
| $G_4\ Cm_4\ \frac{Cf_4}{Cf_4\ Cy_4}$ | Baliguda |
| | Khendmals<br>Kanjipani<br>Pallahara |
| $G_3\ Cm_4\ Cf_4/Cy_4$ | Umarkot |

TABLE 13

**Relative Yield Index of Principal Crops in Zone VII**

(All-India average yield = 100)

| District | rice | maize | small millets | ragi | total Pulses |
|---|---|---|---|---|---|
| Keonjhar | 87 | 73 | 155 | 101 | 142 |
| Dhenkanal | 94 | 66 | 144 | 91 | 106 |
| Koraput | 80 | 77 | 99 | 107 | 92 |
| Phulbani | 79 | 69 | 74 | 86 | 63 |

**Rainfall Zone VIII—$D_1\ E_3\ (A_2\ B_2)\ C_1\ E_3$**

4.52 The districts taluks and cropping patterns included in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_2\ Pu_4$ | Karanjia | Mayurbhanj |
| $Pd_1$ | Rairangpur | |
| | Anandpur | Keonjhar |
| $Pd_2\ Pu_4$ | Sukinda | Cuttack |
| | Tigiria | ,, |
| | Jajpur | ,, |
| | Darpan | ,, |
| | Salepur | ,, |
| | Cuttack | ,, |
| $Pd_2\ G_4$ | Adgarh | ,, |
| $Pd_2\ Pu_4$ | Baramba | ,, |
| | Narsinghpur | ,, |
| | Banki | ,, |
| $Pd_2\ O_4\ Pu_5$ | Hindol | Dhenkanal |
| $Pd_2\ Pu_4$ | Lanjigarh | Kalahandi |
| | Khandpara | Puri |
| | Daspilla | ,, |

4.53 The area of the zone is 18309 sq km and taluk areas vary from 119 to over 3077 sq km.

4.54 About 13 per cent of land in Cuttak district is not available for cultivation and forests occupy 8 per cent of the area. Net sown area is 63 per cent.

4.55 Soils are red loamy except in the eastern part where laterite is the main soil with a narrow strip of coastal alluvium. Nearly 40 per cent of area is irrigated in Cuttack district followed by 30 per cent in Puri district.

4.56 The annual average rainfall is 150 cm in 77 rainy days. The month of maximum rainfall is July and together with August accounts for 45 per cent of annual rainfall. All the four months from June to September get more than 20 cm pm rainfall.

4.57 Paddy occupies more than 50 per cent of cropped area in all the taluks. The other important crop grown is 'other pulses'. The cropping patterns are :

| | |
|---|---|
| $Pd_1$ | Rairangpur<br>Anandapur<br>Sukinda<br>Tigiria |
| $Pd_2\ Pu_4/G_4/O_4$ | Rest of the Zone. |

4.58 Yield of paddy in Cuttack district is 88 per cent of all-India level and that of total pulses 116 per cent.

4.59 Male cattle accounts for 25 per cent of livestock population in the Zone. Female cattle, goats and young stock cattle constitute the remaining 62 per cent of livestock. In some taluks female cattle and goats deminate, hence there are livestock patterns beginning with female cattle and goats also. The livestock patterns are :

| | |
|---|---|
| $Cm_3\ Cf_4\ Cy_4/G_4$ | Athgarh<br>Tigiria |
| $Cm_4\ Cf_4\ Cy_4/G_4$ | Sukinda<br>Jaipur<br>Darpan<br>Salepur<br>Anandpur |
| $Cm_4\ G_4\ Cf_4\ Cy_4$ | Baramba<br>Narsinghpur<br>Hindol |
| $Cf_4\ Cm_4\ Cy_4/G_4$ | Banki<br>Cuttack<br>Athgarh<br>Khandpara |
| $G_3\ Cm_4\ Cf_4/Cy_4$ | Rairangpur<br>Karanjia |
| $G_4\ Cm_4\ Cf_4\ Cy_4$ | Daspalla |

**Rainfall Zone IX—$D_1\ E_3\ (A_2\ B_2)\ C_1\ D_1\ E_4$**

4.60 The districts, taluks and the cropping patterns included in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_1$ | Jagatsinghpur | Cuttack |
| $Pd_2\ Pu_4$ | Niali | ,, |
| $Pd_3\ Pu_4$ | Nimapara | Puri |
| $Pd_1$ | Bhubaneswar | ,, |
| $Pd_2\ Pu_4$ | Pipli | ,, |
| $Pd_1$ | Khurda | ,, |
| $Pd_2\ Pu_4/G_4$ | Ranpur | ,, |

4.61 The area of the zone is 4894 sq km and areas of all taluks are less than 1000 sq km. The zone is densely populated except in its southern part where population density is 163 per sq km in Ranpur and 260 in Khurda.

4.62 In Puri district area under forests is 28 per cent and land not available for cultivation is 13 per cent. Net sown area is 43 per cent.

4.63 Soils are red loamy except along the coast where they are coastal alluvium with patches of laterite. About 30 per cent of net sown area is irrigated in Puri district.

4.64 Rainfall is quite heavy, the annual average ranging between 150 to 190 cm in 70 rainy days. July is the month of maximum rainfall and July and August account for 45 per cent of annual rainfall.

4.65 Paddy occupies about 60 per cent and other pulses nearly 20 per cent of the cropped area.

4.66 In Puri district, yield of paddy is 94 per cent of all-India level and that of total pulses is 128 per cent.

4.67 For the zone as a whole cattle constitute 73 per cent of total livestock population, followed by goats (14 per cent) and sheep (10 per cent). The livestock patterns are :

| | |
|---|---|
| Jagatsinghpur | $Cm_3\ Cf_4\ Cy_4$ |
| Nimapara<br>Bhubaneswar<br>Pipli<br>Ranpur | $Cm_4\ Cf_4\ Cy_4$ |
| Khurda | $Cf_4\ Cm_4\ Cy_4$ |
| Niali | $Cf_4\ Cm_4\ Cy_4\ G_4/S_4$ |

**Rainfall Zone X—$D_1\ E_3\ (A_3\ B_1)\ D_1\ E_4$**

4.68 The districts, taluks and the cropping patterns included in the zone are :

| *Pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_1$ | Motu | Koraput |
| | Malkangiri | ,, |
| $Pd_2\ R_4$ | Jeypore | ,, |

4.69 The area of the zone is 7768 sq km with the area of taluks ranging from 1800 to 3300 sq km. The population density in the zone is very low with Motu having a population density of 25 per sq km, Malkangiri (62) and Jeypore (87).

4.70 The net sown area is 32 per cent in Koraput district.

4.71 Soils are mainly red loamy.

4.72 Rainfall in the zone is high, annual averages ranging from 160 to 200 cm in 80 to 90 rainy days. August is the month of maximum rainfall, July and August accounting for 55 per cent of the total rainfall. June gets more than 20 cm.

4.73 Paddy is the main crop followed by ragi (11 per cent) and bajra (7 per cent).

4.74 The livestock pattern of the zone is $Cm_4\ G_4\ Cf_4\ Cy_4/S_4\ Bm_4$.

**Rainfall Zone XI—$D_2$ $E_2$ ($B_4$) $C_1$ $D_1$ $E_2$**

4.75 The districts, taluks and the cropping patterns in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_3$ $Pu_4$ $R_4$ | R. Udayagiri | Ganjam |
| $Pd_3$ $Pu_4$ | Surada | ,, |

4.76 Although it is a small zone comprising only two taluks, the areas are large, Surada being 945 sq km and R. Udayagiri 2359 sq km. The population density is 103 per sq km in Surada and 53 in R. Udayagiri.

4.77 Soils are red loamy with laterite patches.

4.78 Annual average rainfall is about 150 cm in 80 rainy days. Rainfall in August is higher than July and together account for nearly 40 per cent of annual. All the months June to September get rainfall in the range of 20—30 cm pm.

4.79 In Surada taluk, paddy occupies per cent of the cropped area followed by 30 per cent under other pulses, whereas paddy occupies 45 per cent area in R. Udayagiri with other pulses and ragi occupying another 20 per cent of cropped area.

4.80 The livestok pattern is $Gm_4$ $Cf_4$ $Cy_4/G_4$

**Rainfall Zone XII— $C_1$ $D_1$ $E_2$ ($A_2$ $B_6$) $C_1$ $E_8$**

4.81 The districts, taluks and the cropping patterns included in the zone are :

| *cropping pattern* | *taluk* | *district* |
|---|---|---|
| $Pd_1$ | Chandbali | Balasore |
| | Dhamnagar | ,, |
| | Bhadrak | ,, |
| | Soro | ,, |
| | Balasore | ,, |
| | Nilgeri | ,, |
| | Betnoti | Mayurbhanj |
| | Udala | ,, |
| | Baripada | ,, |

4.82 The area of the zone is 10,528 sq km and the area of half the number of taluks are less than 1000 sq km. The population density ranges from 140 per sq km in Mayurbhanj to 358 in Balasore taluk.

4.83 Forest area occupies 33 per cent of the area in Mayurbhanj and only 15 per cent in Balasore. Hence net sown area is only 42 per cent in Mayurbhanj and 70 per cent in Balasore.

4.84 Soils are red loamy in Balasore district, except in the southeast region where it is deltaic alluvium. In Mayurbhanj, soils are mainly red and yellow with a small area in the South with red loamy soils. Area under irrigation is only 10 per cent of cropped area.

4.85 The annual average rainfall varies between 150 and 200 cm in 75 to 85 rainy days. July is the month of maximum rainfall and together with August accounts for 40 per cent of annual, both the months getting more than 30 cm pm.

4.86 Paddy is the main crop of the area ranging from 80 to 96 per cent of their respective cropped areas.

4.87 The yield of paddy is only 88 per cent of all-India.

4.88 Male cattle constitute 29 per cent of total livestock population, closely followed by goats (22 per cent), male cattle (21 per cent and youngstock cattle (20 per cent). The taluk livestock patterns are :

Chandbali, Dhamnagar, Bhadrak, Soro, Balasore, Betonte — $Cm_3\ Cf_4\ \frac{Cy_4}{G_4}$

Vdala, Nilgiris, Barapada — $G_3\ Cm_4\ \frac{Cf_4}{Cy_4}$

## 5 FUTURE CROPPING PATTERNS—SOME OBSERVATIONS

### General

5.1 In the foregoing sections we have dealt with in detail the rainfall, cropping and livestock patterns which emerge from the existing information. We have also categorised the rainfall patterns into zones and discussed how the other patterns feature in those zones. Among other information, that on soils, which ought to play an important role in determining cropping patterns, is lacking in such details as are wanted for this analysis. Data on orography and population density have featured in this analysis but their exact role on cropping and livestock patterns could not be brought out owing to lack of detailed information. We are, however, convinced that studies and analysis indicated in the preceding sections are important for the guidance they may give in deciding cropping and livestock patterns *vis a vis* rainfall patterns. The greater the accuracy of the primary information, and the more detailed such information is, the more useful the data would be in drawing up the most efficient cropping and livestock patterns in an area or a zone. With this purpose in view the following procedures are suggested :

(i) Delineation of rainfall zones;
(ii) Indentification of the existing cropping patterns;
(iii) Assessment of area needed for each crop and its ideal distribution.
(iv) Comparison of (iii) with (ii) in order to determine possible changes; and
(v) Consideration of other related factors like soil, irrigation facilities, density of population, livestock patterns and then arriving at the future cropping patterns.

5.2 The methods of delineating rainfall patterns or zones and cropping patterns have been fully discussed in section 2. For the purpose of locating suitable areas for a crop, soil and topography of the land are important factors. The approximate area to be put under each crop will be decided by the demand for it not only at State level but at the national level, either for internal consumption or for the purpose of export. The departments responsible for crop planning of a State should, therefore, be cognisant of the demand for a crop, so that production efforts are not rendered futile because of lack of demand and marketing. We have already discussed the part each of the factors mentioned in item (v) of para 5.1 is likely to play in deciding cropping patterns. For this purpose not only detailed data but also knowledge about the correlation between these factors and crop performance would be necessary. Knowledge gained, through long experience, by farmers would also be most helpful.

5.3 It may be mentioned that the rainfall intervals which form the basis of identifying rainfall patterns are subject to minor modifications. Thus, the condition that 30 cm of rainfall for three consecutive months is good for paddy may not be rigourously adhered to. If the soil is favourable with a high water retention capacity or, what is more important, water management is efficient with an eye to economise water use, rainfall lower than 30 cm for three months may sustain a good crop of paddy.

5.4 The choice of a cropping pattern is not decided by the farmer only on technical grounds. He is also guided by the profitability of the crops or requirements for his household consumption. Farmers may not be inclined to accept a crop unless the necessary inputs and infrastructure are assured. Of all the inputs water is the most important as is made evident by the spread of groundnut in the country, sugarcane in Gujarat, maize and cotton in Karnataka and recently of wheat in West Bengal. These are excellent instances of the manner of introduction of new crops in the cropping patterns of a State or a region.

**Some Observations pertaining to Orissa**

5.5 The rainfall pattern in majority of the area of the State is of $A_2$ $B_2$ category during the south-west monsoon period. Along the coast and adjoining parts, the month of May gets 5 to 10 cm of rainfall and even in the months of October and November, there is rainfall either of $C_1$ $D_1$ or $D_1$ $E_1$ categories. Consequently, farmers are tempted to take three crops of rice and this crop in aggregate occupies approximately 73 per cent of the gross cropped area of the State. The area under pulses approximates to 14 per cent of the total gross cropped area (1965-66 to 1971-72 averages). Mung and horsegram are the important pulse crops.

5.6 A reference to Chapter 21 on Foodgrain Crops would show that the area occupied by and the performance of the different rice crops is as under :--

| *crop* | *area as percentage of total area under rice in the State* | *yield as per cent of overall State rice yield* |
|---|---|---|
| February-May sown crop | 12 | 60 |
| June-September sown crop | 83 | 98 |
| October-January sown crop | 5 | 241 |

The February to May sown crop, though favoured by the farmers, particularly along the coast gives very poor yields. The farmers pin their hopes on May thunder showers, but these are undependable and the amount of rainfall is generally insufficient. Water supply in Orissa coastal areas does not appear to be sufficient to meet the full needs of this crop. Purely on scientific considerations, it should be considered as to why February to May sown rice crop should not be given up. Instead, May thunder showers supported by available irrigation could prove sufficient for raising successfully rice seedlings for early transplanting of regular Kharif crop. From the report on Rainfall or Cropping Patterns received from the State it seems that there is a favourable reaction to such a proposition. This idea needs pursuing.

5.7 Maiz occupies about 1 per cent of the gross cropped area of the State, but its yield are low. The rainfall in general is conducive for crops like maize and soyabean provided care is taken to see that field drainage is provided during heavy rainy periods.

5.8 The oilseeds like groundnut, seasamum, lineseed castor, rape seed and mustard occupy about 5 per cent of the area even now, but their area further requires to be increased and some new oilseed crops could also be profitably introduced. The area under potato, sugarcane and tobacco also could be increased with advantage. Extension of agave cultivation needs special attention in hilly areas. The hilly areas of the State are also suitable for some plantation crops like cashew and other economic tree crops and grasses and forage legumes.

## APPENDIX 1

### Talukwise Livestock Population—1966

### ORISSA

(Thousands)

| District/taluk | Cattle | | | Buffaloes | | | Sheep | Goats | Horses & ponies | Mules & Donkeys | Camels | Pigs | Total live-stok |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Young stock | Male | Female | Young stock | | | | | | | |
| | *Rainfall Zone—1* .. | | | .. | .. | .. | .. | .. | | *Rainfall* | *Pattern—$E_4$* | *($A_2B_2$)* | *$D_1E_3$* |
| **Sundargarh:** | | | | | | | | | | | | | |
| Sundargarh | 47 (27) | 30 (17) | 28 (16) | 10 (6) | 1 (1) | 1 (1) | 6 (4) | 44 (25) | 1 (1) | 0·4 (0·3) | — (—) | 4 (2) | 174 |
| Rajgangpur | 41 (20) | 18 (9) | 72 (36) | 6 (3) | 2 (1) | 3 (1) | 15 (7) | 40 (20) | 2 (1) | 0·2 (0·1) | — (—) | 3 (2) | 202 |
| Hemgir | 24 (26) | 17 (19) | 17 (18) | 6 (7) | 1 (1) | 1 (1) | 1 (1) | 25 (26) | ·4 (.4) | — (—) | — (—) | 1 (1) | 94 |
| Kurmunda | 47 (20) | 36 (15) | 31 (13) | 10 (4) | 5 (2) | 4 (2) | 25 (11) | 68 (29) | 1 (1) | 0·2 (0·1) | — (—) | 7 (3) | 234 |
| Bonai | 40 (21) | 32 (17) | 26 (14) | 14 (7) | 3 (2) | 2 (1) | 8 (4) | 61 (32) | 1 (·4) | — (—) | — (—) | 4 (2) | 191 |
| **Sambalpur** | | | | | | | | | | | | | |
| Sambalpur | 56 (34) | 37 (23) | 31 (18) | 4 (2) | 1 (1) | 1 (0·4) | 10 (6) | 25 (15) | 0·4 0·2) | — — | — (—) | 0·1 (0·1) | 165 |
| Jharsuguda | 68 (36) | 36 (20) | 33 (18) | 9 (5) | 1 (1) | 1 (0·4) | 8 (4) | 30 (16) | 0·4 (0·2) | — (—) | — (—) | 0·4 (0·2) | 185 |
| Bargarh | 118 (45) | 52 (20) | 43 (16) | 13 (5) | 2 (1) | 3 (1) | 12 (5) | 16 (6) | 1 (0·4) | — (—) | — (—) | 1 (1) | 261 |
| Padampur | 116 (37) | 55 (17) | 52 (16) | 14 (5) | 4 (1) | 4 (1) | 23 (7) | 48 (15) | 1 (0·3) | — (—) | — (—) | 1 (0·3) | 319 |
| Rairakhol | 20 (23) | 18 (21) | 13 (15) | 6 (7) | 4 (5) | 3 (3) | 2 (2) | 20 (23) | 0·4 (1) | — (—) | — (—) | — (—) | 85 |
| Deogarh | 37 (28) | 25 (19) | 20 (15) | 7 (6) | 3 (2) | 2 (1) | 4 (3) | 34 (25) | 1 (1) | — (—) | — (—) | — (—) | 133 |
| Kuhinda | 53 (33) | 31 (19) | 22 (14) | 7 (4) | 1 (1) | 1 (0·4) | 1 (1) | 43 (26) | 1 (1) | — (—) | — (—) | 1 (0·3) | 161 |
| **Dhenkanal** | | | | | | | | | | | | | |
| Athmallik | 37 (19) | 37 (19) | 33 (17) | 9 (5) | 10 (5) | 8 (4) | 19 (10) | 41 (21) | 0·3 (0·2) | — (—) | — (—) | — (—) | 194 |
| **Phulbani** | | | | | | | | | | | | | |
| Baudh | 63 (19) | 69 (20) | 49 (14) | 16 (5) | 9 (3) | 8 (2) | 45 (13) | 78 (23) | 1 (0·3) | — (—) | — (—) | 1 (0·4) | 340 |
| **Bolangir** | | | | | | | | | | | | | |
| Bolangir | 76 (25) | 54 (18) | 45 (15) | 16 (5) | 6 (2) | 5 (2) | 44 (14) | 55 (18) | 1 (0·4) | — (—) | — (—) | 1 (0·2) | 303 |
| Sonepur | 58 (30) | 35 (18) | 33 (17) | 8 (4) | 3 (2) | 2 (1) | 23 (12) | 28 (15) | 0·2 (0·1) | — (—) | — (—) | 0·3 (0·2) | 191 |
| Birmaharajpur | 37 (32) | 29 (25) | 19 (16) | 5 (5) | 3 (2) | 2 (1) | 8 (7) | 13 (11) | — (—) | — (—) | — (—) | — (—) | 116 |
| Patnagarh | 56 (23) | 36 (15) | 53 (22) | 10 (4) | 8 (3) | 6 (3) | 28 (11) | 46 (18) | 1 (0·4) | — (—) | — (—) | 1 (0·3) | 245 |
| Titlagarh | 52 (22) | 36 (15) | 30 (13) | 17 (7) | 13 (6) | 9 (4) | 38 (16) | 36 (16) | 1 (0·2) | — (—) | — (—) | 1 (0·2) | 233 |
| **Kalahandi** | | | | | | | | | | | | | |
| Kalahandi | 24 (23) | 16 (15) | 12 (11) | 4 (4) | 5 (5) | 4 (4) | 14 (14) | 19 (18) | 2 (2) | — (—) | — (—) | 4 (4) | 105 |
| Dharamgarh | 36 (26) | 26 (18) | 21 (15) | 11 (8) | 6 (4) | 6 (4) | 18 (13) | 15 (11) | 0·2 (0·2) | 0·1 (0·1) | — (—) | 0·4 (0·3) | 140 |
| Jaipatna | 46 (30) | 28 (19) | 22 (15) | 11 (8) | 6 (4) | 4 (3) | 18 (12) | 13 (9) | 1 (0·4) | 0·2 (0·1) | — (—) | — (—) | 150 |
| Nawapara | 56 (26) | 43 (10) | 32 (15) | 16 (7) | 18 (8) | 13 (6) | 12 (6) | 30 (13) | 1 (0·3) | 0·1 (0·1) | — (—) | 1 (0·3) | 224 |

Note : Figures in brackets represent percentages to total livestock population.

APPENDIX 1 (*Contd.*)

(Thousands)

| District/taluk | Cattle | | | Buffaloes | | | Sheep | Goats | Horses & ponies | Mules & Donkeys | Camels | Pigs | Total live-stock |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Young stock | Male | Female | Young stock | | | | | | | |
| | *Rainfall Zone—I* (Contd.) | | | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—$E_4$ ($A_2B_2$) $D_1E_3$* | | | |
| **Koraput** | | | | | | | | | | | | | |
| Kashipur | 34 (22) | 22 (20) | 16 (15) | 3 (3) | 10 (9) | 6 (5) | 7 (6) | 20 (18) | 0·2 (0·2) | 0·1 (0·1) | — (—) | 2 (2) | 111 |
| | *Rainfall Zone—II* | | | . | . | . | . | . | . | *Rainfall Pattern $D_1E_3$ ($C_4$) $C_1D_1E_2$* | | | |
| **Ganjam** | | | | | | | | | | | | | |
| Chatrapur | 36 (30) | 29 (24) | 21 (18) | 2 (1) | 2 (1) | 1 (0·4) | 6 (5) | 23 (19) | 0·1 (0·1) | 1 (0·4) | — (—) | 1 (·4) | 120 |
| | *Rainfall Zone—III* .. | | | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—$D_1E_3$ ($B_3$ $C_1$) $C_1$ $E_3$* | | | |
| **Koraput** | | | | | | | | | | | | | |
| Gunupur | 33 (23) | 26 (18) | 23 (16) | 10 (7) | 6 (4) | 5 (3) | 7 (5) | 29 (19) | 1 (1) | — (—) | — (—) | 6 (4) | 144 |
| **Bissam** | | | | | 2 | | | | | | | | |
| Cuttack | 14 (25) | 11 (20) | 8 (14) | 2 (4) | (4) | 1 (2) | 4 (7) | 11 (20) | 0·1 (0·2) | 0·1 (0·1) | — (—) | 2 (3) | 56 |
| Rayagada | 36 (23) | 26 (16) | 21 (13) | 20 (12) | 13 (8) | 9 (6) | 13 (8) | 22 (13) | 0·2 (0·1) | — (—) | — (—) | 2 (1) | 162 |
| | *Rainfall Zone—IV* .. | | | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—$D_1E_3$ ($B_3C_1$) $C_1D_1E_2$* | | | |
| **Phulbani** | | | | | | | | | | | | | |
| G. Ulayagiri | 36 (26) | 25 (18) | 15 (10) | 9 (6) | 8 (6) | 5 (3) | 1 (1) | 40 (28) | — (—) | — (—) | — (—) | 3 (2) | 142 |
| **Ganjam** | | | | | | | | | | | | | |
| Ghumusur | 46 (25) | 51 (27) | 39 (21) | 14 (7) | 3 (2) | 3 (1) | 10 (5) | 21 (11) | 0·2 (0·1) | — (—) | — (—) | 0·4 (0·2) | 187 |
| Aska | 41 (26) | 39 (25) | 30 (19) | 9 (6) | 4 (2) | 2 (2) | 12 (8) | 18 (11) | 0·2 (0·1) | — (—) | — (—) | 1 (1) | 157 |
| Digapahandy | 45 (27) | 38 (23) | 31 (18) | 9 (5) | 3 (2) | 2 (1) | 12 (7) | 27 (16) | 0·3 (0·2) | 1 (0·3) | — (—) | 1 (0·4) | 168 |
| Chikiti | 13 (24) | 16 (29) | 8 (15) | 4 (7) | 1 (2) | 1 (2) | 3 (5) | 8 (15) | 0·3 (1) | — (—) | — (—) | 0·1 (0·1) | 54 |
| Berhampur | 29 (28) | 23 (22) | 19 (19) | 2 (2) | 2 (2) | 2 (2) | 12 (11) | 13 (13) | 1 (1) | — (—) | — (—) | 0·4 (0·4) | 104 |
| Kodala | 60 (29) | 51 (25) | 43 (21) | 7 (4) | 5 (2) | 3 (2) | 8 (4) | 25 (13) | 0·2 (0·1) | — (—) | (—) (—) | 1 (0·3) | 204 |
| Parlakhemundi | 36 (23) | 24 (16) | 23 (15) | 16 (11) | 9 (6) | 8 (5) | 3 (2) | 26 (17) | 0·2 (0·1) | 2 (2) | — (—) | 4 (3) | 153 |
| **Puri** | | | | | | | | | | | | | |
| Puri | 61 (29) | 47 (22) | 47 (22) | 0·3 (0·1) | 2 (1) | 1 (0·4) | 22 (11) | 29 (14) | — (—) | 0·4 (0·2) | — (—) | 1 (0·3) | 209 |
| Banpur | 28 (30) | 22 (24) | 19 (21) | 4 (5) | 2 (2) | 1 (1) | 2 (2) | 13 (15) | 1 (1) | — (—) | — (—) | — (—) | 92 |
| Krishnaprasad | 6 (21) | 5 (20) | 4 (14) | 2 (7) | 4 (16) | 3 (10) | 0·4 (2) | 2 (9) | 0·1 (0·4) | — (—) | — (—) | — (—) | 27 |
| | *Rainfall Zone—V* .. | | | .. | .. | .. | .. | .. | .. | .. *Rainfall Pattern—$D_1$ $E_3$ ($B_4$) $C_1$ $E_3$* | | | |
| **Balasore** | | | | | | | | | | | | | |
| Jaleswar | 56 (37) | 33 (22) | 30 (20) | 0·3 (0·2) | 1 (0·4) | 0·2 (0·1) | 2 (1) | 25 (17) | 2 (1) | — (—) | — (—) | 2 (1) | 150 |
| Basta | 44 (35) | 28 (21) | 25 (20) | — (—) | 0·2 (0·2) | 0·1 (0·1) | 1 (1) | 27 (21) | 0·4 (0·3) | 0·2 (0·1) | — (—) | 1 (1) | 127 |
| **Puri** | | | | | | | | | | | | | |
| Nayagarh | 45 (23) | 45 (23) | 45 (23) | 15 (7) | 2 (1) | 2 (1) | 8 (4) | 35 (18) | 0·3 (0·2) | 0·2 (0·1) | — (—) | 0·1 (0·1) | 199 |

APPENDIX 1 (*Contd.*)

(Thousands)

| District/taluk | Cattle | | | Buffaloes | | | Sheep | Goats | Horses and ponies | Mules and Donkeys | Camels | Pigs | Total live-stock |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Young stock | Male | Female | Young stock | | | | | | | |
| | *Rainfall Zone—VI* .. | | | .. | .. | .. | .. | .. | *Cropping Pattern—$D_1$ $E_3$ ($A_1B_3$) $C_1E_3$* | | | | |
| **Cuttack** | | | | | | | | | | | | | |
| Kujang | 49 (34) | 41 (28) | 26 (18) | 0·2 (0·2) | 3 (2) | 1 (1) | 7 (5) | 17 (11) | 0·2 (0·2) | — (—) | — (—) | 0·3 (0·2) | 147 |
| Kendrapara | 31 (32) | 26 (27) | 20 (21) | 0·2 (0·1) | 0·2 (0·2) | 0·1 (0·1) | 4 (4) | 13 (14) | 0·4 (1) | — (—) | — (—) | 0·2 (0·2) | 96 |
| Kanika | 17 (26) | 16 (25) | 19 (30) | 0·3 (7) | 1 (1) | 1 (1) | 3 (5) | 7 (10) | 0·4 (1) | 0·2 (0·3) | — (—) | 0·1 (0·2) | 64 |
| Aul | 16 (25) | 24 (36) | 20 (30) | — (—) | 0·2 (0·3) | 0·1 (0·2) | 1 (1) | 5 (7) | — (—) | — (—) | — (—) | — (—) | 65 |
| Patmundai | 32 (41) | 12 (15) | 24 (31) | 0·2 (0·2) | 2 (2) | 1 (1) | 3 (4) | 5 (6) | — (—) | — (—) | — (—) | — (—) | 79 |
| Marrsaghai | 50 (28) | 45 (25) | 39 (21) | 1 (1) | 5 (3) | 3 (2) | 11 (6) | 26 (14) | 1 (0·4) | — (—) | — (—) | 0·3 (0·2) | 182 |
| | *Rainfall Zone—VII*.. | | | .. | .. | .. | .. | .. | .. *Rainfall Pattern—$D_1E_3$ ($A_2B_2$) $D_1$ $E_3$* | | | | |
| **Keonjhar** | | | | | | | | | | | | | |
| Barbil | 13 (31) | 6 (14) | 4 (10) | 1 (3) | 1 (2) | 1 (1) | 4 (10) | 10 (24) | 0·4 (1) | 0·2 (1) | — (—) | 1 (3) | 42 |
| Keonjhar | 23 (31) | 12 (17) | 10 (14) | 2 (2) | 1 (1) | 0·4 (1) | 7 (9) | 17 (23) | 1 (2) | — (—) | — (—) | 0·2 (0·2) | 75 |
| Champua . | 37 (30) | 19 (15) | 14 (12) | 3 (3) | 1 (1) | 1 (1) | 10 (8) | 34 (28) | 2 (2) | — (—) | — (—) | 0·3 (0·2) | 122 |
| Kanjipani | 73 (24) | 49 (16) | 40 (14) | 11 (4) | 7 (2) | 5 (2) | 26 (9) | 84 (28) | 3 (1) | 0·2 (0·1) | — (—) | 1 (0·3) | 299 |
| **Dhenkanal** | | | | | | | | | | | | | |
| Angul | 60 (126) | 55 (23) | 37 (16) | 8 (3) | 9 (4) | 6 (3) | 20 (8) | 41 (17) | 0·2 (0·1) | — (—) | — (—) | 0·3 (0·1) | 235 |
| Talcher | 30 (30) | 21 (22) | 14 (15) | 3 (3) | 3 (3) | 2 (2) | 4 (4) | 19 (20) | 1 (1) | — (—) | — (—) | — (—) | 97 |
| Pallahara | 18 (26) | 11 (16) | 10 (14) | 3 (4) | 2 (2) | 1 (1) | 5 (7) | 20 (29) | 1 (1) | — (—) | — (—) | — (—) | 70 |
| Dhenkaral | 49 (25) | 43 (23) | 35 (18) | 5 (3) | 9 (5) | 6 (3) | 6 (3) | 34 (18) | 1 (2) | — (—) | — (—) | 0·1 (0·1) | 189 |
| Kamakhyanagar | 67 (30) | 40 (19) | 35 (16) | 8 (4) | 10 (5) | 6 (3) | 8 (4) | 40 (18) | 1 (1) | — (—) | — (—) | — (—) | 214 |
| **Koraput** | | | | | | | | | | | | | |
| Koraput | 49 (22) | 44 (19) | 28 (12) | 12 (5) | 13 (6) | 11 (5) | 22 (10) | 34 (15) | 1 (0·4) | 0·2 (0·1) | — (—) | 11 (5) | 225 |
| Nandapur | 36 (21) | 31 (18) | 17 (10) | 11 (6) | 9 (5) | 6 (3) | 21 (13) | 31 (18) | 0·3 (0·2) | 0·2 (0·1) | — (—) | 10 (6) | 172 |
| Boriguma | 20 (26) | 12 (17) | 9 (12) | 5 (6) | 2 (3) | 2 (3) | 12 (16) | 10 (13) | 0·1 (0·2) | 0·3 (0·4) | — (—) | 3 (4) | 76 |
| Kotpad | 7 (23) | 5 (15) | 4 (13) | 4 (13) | 1 (3) | 1 (3) | 3 (10) | 4 (12) | 0·3 (1) | 0·1 (0·3) | — (—) | 2 (7) | 30 |
| Nowrangapur | 47 (24) | 26 (13) | 18 (10) | 13 (7) | 8 (4) | 8 (4) | 28 (15) | 37 (20) | 1 (0·4) | 0·1 (0·1) | — (—) | 6 (3) | 191 |
| Umarkot | 54 (21) | 32 (12) | 28 (10) | 17 (6) | 7 (3) | 5 (2) | 15 (6) | 93 (35) | 2 (1) | 1 (0·3) | — (—) | 10 (4) | 263 |
| **Phulbani** | | | | | | | | | | | | | |
| Khontmals | 26 (23) | 17 (16) | 9 (8) | 7 (6) | 6 (6) | 4 (3) | 2 (2) | 31 (28) | 1 (1) | 1 (1) | — (—) | 6 (6) | 110 |
| Baliguda | 37 (25) | 26 (17) | 17 (11) | 6 (4) | 8 (5) | 4 (2) | 2 (1) | 37 (25) | 1 (1) | 0·1 (0·1) | — (—) | 13 (9) | 150 |
| | *Rainfall Zone—VIII*.. | | | .. | .. | .. | .. | .. | .. *Rainfall Pattern—$D_1E_3$ ($A_2B_2$) $C_1E_3$* | | | | |
| **Mayurbhanj** | | | | | | | | | | | | | |
| Karanjia | 58 (22) | 32 (12) | 26 (10) | 8 (3) | 2 (1) | 2 (1) | 23 (9) | 107 (41) | 1 (0·2) | — (—) | — (—) | 2 (1) | 261 |
| Rairangpur | 87 (26) | 39 (12) | 34 (10) | 9 (3) | 1 (0·3) | 1 (0·3) | 58 (18) | 92 (28) | 0·4 (0·1) | — (—) | — (—) | 6 (2) | 327 |

APPENDIX 1 (*Contd.*)

(Thousands)

| District/taluk | Cattle | | | Buffaloes | | | Sheep | Goats | Horses and ponies | Mules and Donkeys | Camels | Pigs | Total live-stock |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Young stock | Male | Female | Young stock | | | | | | | |
| | *Rainfall Zone—VIII* (Contd.) | | | .. | .. | .. | .. | .. | .. | *Rainfall. Pattern—$D_1E_3$ ($A_2B_2$) $C_1E$* | | | |
| **Keonjhar** | | | | | | | | | | | | | |
| Anandapur | 57 (28) | 48 (24) | 39 (19) | 1 (1) | 1 (1) | 1 (0·4) | 11 (5) | 43 (20) | 1 (0·3) | 0·2 (0·1) | — (—) | 1 (1) | 203 |
| **Cuttack** | | | | | | | | | | | | | |
| Sukinda | 45 (26) | 44 (26) | 37 (21) | 1 (1) | 3 (2) | 2 (1) | 4 (2) | 35 (20) | 2 (1) | — (—) | — (—) | 0.4 (0·2) | 173 |
| Jeypore | 67 (27) | 64 (26) | 64 (26) | — (—) | 0·3 (0·1) | — (—) | 6 (2) | 44 (18) | 1 (0·4) | 0·2 (0·1) | — (—) | 1 (0·2) | 248 |
| Darpan | 50 (24) | 54 (26) | 47 (23) | 1 (0·3) | 2 (1) | 2 (1) | 8 (4) | 43 (20) | 0·4 (0·2) | — (—) | — (—) | 1 (0·3) | 207 |
| Salepur | 49 (25) | 50 (26) | 41 (21) | — (—) | 0·3 (0·2) | 0·4 (0·2) | 11 (6) | 40 (21) | 0·3 (0·2) | — (—) | — (—) | 0·2 (0·1) | 207 |
| Cuttack | 34 (23) | 46 (30) | 36 (26) | 1 (0·3) | 1 (1) | 1 (1) | 10 (7) | 21 (14) | 0·2 (0·1) | — (—) | — (—) | 0·1 (0·1) | 149 |
| Athgarh | 16 (31) | 12 (23) | 11 (21) | 1 (1) | 2 (3) | 1 (2) | 1 (2) | 9 (17) | — (—) | — (—) | — (—) | 0·2 0·4 | 53 |
| Tigiria | 6 (36) | 3 (17) | 3 (16) | 1 (7) | 0·4 (3) | 0·4 (3) | 0.4 (3) | 3 (16) | — (—) | — (—) | — (—) | — (—) | 16 |
| Baramba | 9 (26) | 8 (22) | 6 (16) | 5 (13) | 1 (2) | 1 (1) | 2 (6) | 4 (12) | 0·3 (1) | — (—) | — (—) | — (—) | 36 |
| Narsinghpur | 11 (25) | 10 (21) | 9 (19) | 4 (8) | 1 (3) | 1 (2) | 2 (4) | 8 (18) | 0·1 (0·2) | — (—) | — (—) | 0·1 (0·1) | 46 |
| Banki . | 19 (22) | 25 (28) | 17 (19) | 2 (3) | 1 (1) | 0·4 (1) | 12 (14) | 12 (14) | 0·2 (0·2) | — (—) | — (—) | — (—) | 89 |
| **Dhenkanal** | | | | | | | | | | | | | |
| Hindol | 21 (25) | 20 (25) | 13 (15) | 3 (4) | 4 (5) | 3 (3) | 5 (6) | 14 (17) | 0·4 (0·4) | — (—) | — (—) | 0·1 (0·1) | 83 |
| **Kalahandi** | | | | | | | | | | | | | |
| Lanjigarh . | 43 (28) | 27 (17) | 22 (14) | 8 (5) | 6 (4) | 3 (2) | 13 (9) | 32 (20) | 1 (0·4) | 0·2 (0·1) | — (—) | 1 (1) | 156 |
| **Puri** | | | | | | | | | | | | | |
| Khandpara | 18 (22) | 21 (26) | 14 (17) | 6 (7) | 1 (2) | 1 (1) | 5 (6) | 16 (18) | 0·4 (1) | — (—) | — (—) | — (—) | 83 |
| Daspalla . | 20 (18) | 24 (22) | 21 (20) | 7 (6) | 5 (4) | 3 (3) | 5 (5) | 23 (21) | 1 (1) | — (—) | — (—) | — (—) | 108 |
| | *Rainfall Zone—IX* .. | | | .. | .. | .. | .. | .. | *Rainfall Pattern—$D_1E_3(A_2B_2)$ $C_1D_1E_2$* | | | | |
| **Cuttack** | | | | | | | | | | | | | |
| Jagatsinghpur . | 66 (30) | 51 (24) | 45 (21) | — (—) | 1 (1) | 1 (0·3) | 21 (10) | 27 (13) | 0·3 (0·1) | 0·2 (0·1) | — (—) | 0·1 (0·1) | 212 |
| Niali . | 21 (20) | 23 (22) | 20 (20) | 0·3 (0·3) | 2 (2) | 2 (2) | 17 (17) | 17 (17) | 0·1 (0·1) | — (—) | — (—) | — (—) | 102 |
| **Puri** | | | | | | | | | | | | | |
| Nimapara | 67 (30) | 55 (26) | 43 (20) | 1 (0·3) | 2 (1) | 3 (1) | 19 (9) | 25 (12) | 0·4 (0·2) | — (—) | — (—) | 0·3 (0·1) | 214 |
| Bhubaneswar | 47 (28) | 45 (27) | 35 (20) | 1 (1) | 1 (1) | 1 (1) | 16 (9) | 22 (13) | 0·3 (0·2) | — (—) | — (—) | 0·1 (0·1) | 168 |
| Pipli | 31 (28) | 29 (26) | 24 (21) | 0·1 (0·1) | 0·4 (0·3) | 1 (1) | 13 (11) | 15 (13) | 0·1 (0·1) | — (—) | — (—) | — (—) | 113 |
| Khurda | 41 (23) | 54 (30) | 33 (19) | 4 (2) | 1 (1) | 1 (1) | 16 (9) | 28 (15) | 0·1 (0·1) | — (—) | — (—) | — (—) | 177 |
| Banpur | 15 (26) | 12 (20) | 12 (21) | 2 (3) | 0·4 (1) | 0·4 (1) | 4 (7) | 11 (20) | 1 (1) | — (—) | — (—) | — (—) | 58 |
| | *Rainfall Pattern— X* | | | .. | .. | .. | .. | .. | *Rainfall Pattern—$D_1E_3$ ($A_3B_1$) $D_1E_3$* | | | | |
| **Koraput** | | | | | | | | | | | | | |
| Motu | 15 (30) | 7 (13) | 5 (10) | 7 (14) | 1 (1) | 0·4 (1) | 5 (10) | 7 (14) | 1 (2) | 0·3 (1) | — (—) | 2 (4) | 49 |
| Malkangiri | 35 (26) | 35 (26) | 23 (17) | 1 (1) | 1 (1) | 1 (1) | 4 (3) | 27 (20) | 0·3 (0·2) | —, (—) | — (—) | 7 (5) | 135 |
| Jeypore | 23 (20) | 19 (17) | 14 (12) | 8 (7) | 4 (4) | 4 (4) | 20 (17) | 20 (17) | 0·1 (0·1) | — (—) | — (—) | 2 (2) | 115 |

APPENDIX I (*Concld.*)

(Thousands)

| District/taluk | Cattle | | | Buffaloes | | | Sheep | Goats | Horses and ponies | Mules and Donkeys | Camels | Pigs | Total live-stock |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Young stock | Male | Female | Young stock | | | | | | | |
| | *Rainfall Zone—XI* .. | | | .. | | | .. | .. | .. | *Rainfall Pattern—$D_2E_2$ ($B_4$)* | | | $C_1D_1E_2$ |
| **Ganjam** | | | | | | | | | | | | | |
| R. Udayagiri | 36 | 31 | 18 | 4 | 2 | 1 | 1 | 34 | 1 | — | — | 5 | 133 |
| | (27) | (24) | (13) | (3) | (1) | (1) | (1) | (25) | (0·4) | (—) | (—) | (4) | |
| Surada | 17 | 15 | 11 | 2 | 1 | 1 | 4 | 7 | 0·1 | — | — | 0·2 | 57 |
| | (29) | (26) | (18) | (4) | (1) | (1) | (7) | (13) | (0·1) | (—) | (—) | (0·3) | |
| | *Rainfall Zone—XII* .. | | | .. | | | .. | .. | .. | *Rainfall Pattern—$C_1D_1E_2$ ($A_2B_2$)* | | | $C_1E_3$ |
| **Balasore** | | | | | | | | | | | | | |
| Chandbali | 41 | 26 | 19 | 1 | 6 | 3 | 1 | 12 | 0·4 | 0·1 | — | 0·2 | 110 |
| | (37) | (24) | (17) | (1) | (5) | (3) | (1) | (11) | (0·4) | (0·1) | (—) | (0·2) | |
| Dhamnagar | 36 | 34 | 31 | — | — | 0·1 | 4 | 17 | 0·1 | — | — | — | 123 |
| | (29) | (27) | (26) | (—) | (—) | (0·1) | (4) | (14) | (0·1) | (—) | (—) | (—) | |
| Bhadrak | 88 | 78 | 65 | 0·2 | 2 | 1 | 3 | 39 | 1 | — | — | 0·2 | 276 |
| | (32) | (27) | (24) | (0·1) | (1) | (0·4) | (1) | (14) | (0·3) | (—) | (—) | (0·1) | |
| Soro | 69 | 60 | 48 | 0·2 | 0·3 | 0·2 | 0·3 | 31 | 1 | — | — | — | 211 |
| | (33) | (29) | (22) | (0·1) | (0·1) | (0·1) | (0·2) | (15) | (1) | (—) | (—) | (—) | |
| Balasore | 56 | 41 | 42 | — | 0·4 | 0·2 | 1 | 33 | 1 | — | — | 0·4 | 175 |
| | (32) | (23) | (24) | (—) | (0·3) | (0·1) | (1) | (18) | (1) | (—) | (—) | (0·3) | |
| Nilgiri | 30 | 25 | 34 | 0·2 | 0·4 | 0·3 | 10 | 43 | 1 | — | — | 1 | 145 |
| | (20) | (17) | (23) | (0·2) | (0·3) | (0·2) | (7) | (30) | 1 | (—) | (—) | (1) | |
| **Mayurbhanj** | | | | | | | | | | | | | |
| Betnoti | 49 | 28 | 28 | 2 | 1 | 1 | 15 | 41 | 0·1 | — | — | 4 | 168 |
| | (28) | (17) | (17) | (1) | (1) | (1) | (9) | (24) | (0·1) | (—) | (—) | (2) | |
| Udala | 47 | 33 | 30 | 4 | 2 | 1 | 16 | 51 | 1 | — | — | 4 | 189 |
| | (24) | (18) | (16) | (2) | (1) | (1) | (9) | (27) | (0·3) | (—) | (—) | (2) | |
| Baripada | 93 | 50 | 47 | 7 | 3 | 2 | 32 | 113 | 2 | — | — | 8 | 356 |
| | (26) | (14) | (13) | (2) | (1) | (1) | (9) | (31) | (1) | (—) | (—) | (2) | |

## APPENDIX 2

### Rainfall and Cropping Patterns

### ORISSA

| Cropping patterns | District/taluk | Geographical area (sq km) | Elevation (masl) max | Elevation (masl) min | Annual rainfall total (cm) | Annual rainfall rd | Annual rainfall mmr | mr | nd | *Consecutive months a | *Consecutive months b | *Consecutive months c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Rainfall Zone—I* | .. | .. | .. | .. | .. | .. | *Rainfall Pattern* | | $E_4$ ($A_2$ $B_2$) | $D_1$ | $E_3$ |
| $Pd_1$ | **Sundargarh** | | | | | | | | | | | |
| | Sundargarh | 1816 | na | na | | | | | | | | |
| | Rajgangpur | 1349 | na | na | 164 | 76 | 7—8 | 94 | 39 | 6—4 | 142 | 62 |
| | Hemgir | 1450 | na | na | | | | | | | | |
| | Kurmunda | 1840 | na | na | | | | | | | | |
| | Bonai | 3357 | na | na | 166 | 80 | 7 | 93 | 38 | 6—4 | 141 | 62 |
| | **Sambalpur** | | | | | | | | | | | |
| | Sambalpur | 2235 | na | na | 163 | 74 | 7—8 | 99 | 38 | 6—4 | 146 | 60 |
| | Jharsuguda | 2147 | na | na | 162 | 73 | 7 | 97 | 38 | 6—4 | 142 | 60 |
| | Bargarh | 2689 | na | na | 145 | 67 | 7—8 | 85 | 34 | 6—4 | 129 | 55 |
| | Padampur | 3143 | na | na | 132 | 64 | 8 | 73 | 32 | 6—4 | 114 | 51 |
| | Rairakhol | 2158 | na | na | 158 | 74 | 7 | 90 | 38 | 6—4 | 138 | 61 |
| | Deogarh | 2782 | na | na | 161 | 78 | 7 | 87 | 37 | 6—5 | 145 | 67 |
| | Kuchinda | 2367 | na | na | | | | | | | | |
| | **Phulbani** | | | | | | | | | | | |
| | Baudh | 3445 | na | na | 145 | 66 | 7 | 79 | 33 | 6—4 | 123 | 53 |
| | **Bolangir** | | | | | | | | | | | |
| | Sonepur | 1388 | na | na | 141 | 61 | 7—8 | 78 | 31 | 6—4 | 124 | 51 |
| | Birmaharajpur | 896 | na | na | | | | | | | | |
| $Pd_2Pu_4$ | Bolangir | 2248 | na | na | 146 | 69 | 8—7 | 78 | 33 | 6—4 | 125 | 55 |
| | Patnagarh | 1882 | na | na | 145 | 69 | 8 | 81 | 34 | 6—4 | 127 | 56 |
| $Pd_2$ $Pu_4$ | Titlagarh | 2442 | na | na | 137 | 67 | 8 | 74 | 34 | 6—4 | 121 | 55 |
| | **Dhenkanal** | | | | | | | | | | | |
| | Athmalex | 1842 | na | na | 147 | 66 | 7 | 79 | 32 | 6—4 | 127 | 53 |
| | **Kalahandi** | | | | | | | | | | | |
| | Dharamgarh | 1361 | na | na | | | | | | | | |
| | Jaipatna | 1554 | na | na | | | | | | | | |
| | **Kalahandi** | | | | | | | | | | | |
| $Pd_2$ $Mt_4$ | Kalahandi | 2594 | na | na | 146 | 69 | 8 | 76 | 33 | 6—4 | 124 | 55 |
| | Nawapara | 3398 | na | na | 136 | 59 | 8 | 77 | 31 | 6—4 | 119 | 49 |
| | **Koraput** | | | | | | | | | | | |
| $Pd_4O_4M_4R_4$ | Koraput | 1502 | na | na | | | | | | | | |

masl =metres above sea level
rd =rainy days
mmr =month of maximum rainfall
mr =total rainfall of mmr plus that of preceding of following month, whichever is higher, in cm.
nd =number of rainy days of mmr plus that of preceding or following month, whichever has higher rainfall.

*Consecutive months with rainfall of more than 10 cm per month
a =Initial month with more than 10 cm of rainfall and number of consecutive months with more 10 cm/month, separated by hyphen.
b =Total rainfall of consecutive months under 'a' in cm.
c =Total number of rainy days of consecutive months under 'a'
na =not available

NOTES : 1. Information on rainfall and rainy days are based on the Memoirs of India Meteorological Department, Vol. XXXI, Part III as on 12th May, 1961.

2. For explanation of coded form of rainfall and cropping patterns, reference may be made to section 2 in the text.

APPENDIX 2 (*Contd.*)

| Cropping patterns | District/taluk | Geographical area (sq km) | Elevation (masl) | | Annual rainfall | | | | | *Consecutive months | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | max | min | total (cm) | rd | mmr | mr | nd | a | b | c |
| | *Rainfall Zone—II* | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—* | | $D_1$ | $E_3$ ($C_4$) | $C_1$ $D_1$ $E_2$ |
| | **Ganjam** | | | | | | | | | | | |
| $Pd_2$ $Pu_4$ | Chatrapur | 767 | na | na | 116 | 56 | 9—10 | 40 | 17 | 6—6 | 102 | 48 |
| | *Rainfall Zone—III* | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—* | | $D_1$ | $E_3$ ($B_3$ $C_1$) | $C_1$ $E_3$ |
| | **Koraput** | | | | | | | | | | | |
| $Pd_3$ $Mt_4$ $Pu_4$ | Gunupur | 2725 | na | na | 121 | 71 | 8 | 49 | 28 | 6—5 | 97 | 56 |
| $Pd_3O_4R_4Mt_5$ | Bissam-Cuttack | 1546 | na | na | 130 | 75 | 8 | 57 | 32 | 6—4 | 99 | 55 |
| $Pd_4$ $O_4$ $R_4$ $Pu_4$ $Mt_4$ | Rayagada | 1808 | na | na | 116 | 72 | 8 | 47 | 29 | 6—5 | 96 | 57 |
| | *Rainfall Zone—IV* | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—* | | $D_1$ | $E_3$ ($B_3$ $C_1$) | $C_1$ $D_1$ $E_2$ |
| | **Phulbani** | | | | | | | | | | | |
| $Pd_3O_4M_4Mt_4$ | G-Udayagiri | 1295 | na | na | 142 | 78 | 8—7 | 55 | 29 | 5—6 | 125 | 66 |
| | **Ganjam** | | | | | | | | | | | |
| $Pd_2$ $Pu_4$ | Ghumusur | 2127 | na | na | na | | | | | | | |
| | Digapahandy | 1067 | na | | na | | | | | | | |
| | Chikiti | 835 | na | | na | | | | | | | |
| | Berhampur | 394 | na | na | 120 | 60 | 9 | 44 | 23 | 6—5 | 97 | 48 |
| | Kodala | 1375 | na | na | 129 | 60 | 8 | 53 | 24 | 6—5 | 109 | 49 |
| $Pd_3$ $Pu_3$ | Aska | 964 | na | na | 137 | 73 | 8 | 50 | 27 | 6—5 | 108 | 57 |
| $Pd_3$ $Pu_4$ $R_4$ | Parlakhemundi | 1406 | na | na | 127 | 64 | 9—8 | 48 | 24 | 6—5 | 101 | 50 |
| | **Puri** | | | | | | | | | | | |
| $Pd_1$ | Banpur | 917 | na | na | 136 | 71 | 8 | 54 | 28 | 6—5 | 113 | 58 |
| $Pd_2$ | Krishnaprasad | 773 | na | na | 86 | 51 | 9 | 32 | 17 | 6—5 | 72 | 43 |
| $Pd_2$ $Pu_4$ | Puri | 1439 | na | na | 137 | 63 | 7 | 55 | 24 | 6—5 | 116 | 53 |
| | *Rainfall Zone—V* | .. | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—* | $D_1$ | $E_3$ ($B_4$) | $C_1$ $E_3$ |
| | **Balasore** | | | | | | | | | | | |
| $Pd_1$ | Jaleshwar | 674 | na | na | 137 | 75 | 8—7 | 54 | 29 | 5—6 | 122 | 64 |
| | Basta | 723 | na | na | na | | | | | | | |
| | **Puri** | | | | | | | | | | | |
| $Pd_2$ $Pu_4/G_4$ | Nayagarh | 1430 | na | na | 133 | 75 | 7 | 55 | 30 | 6—5 | 110 | 60 |
| | *Rainfall Zone—VI* | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—* | | $D_1$ | $E_3$ ($A_1$ $B_3$) | $C_1$ $E_3$ |
| | **Cuttack** | | | | | | | | | | | |
| $Pd_1$ | Kujang | 1013 | na | | na | | | | | | | |
| | Kendrapara | 399 | na | na | 144 | 68 | 7 | 60 | 28 | 6—5 | 120 | 57 |
| | Kanika | 638 | na | na | 152 | 68 | 7 | 60 | 27 | 6—5 | 125 | 56 |
| | Patamundai | 552 | na | na | 159 | 68 | 7 | 70 | 28 | 5—6 | 142 | 60 |
| | Marsaghai | 611 | na | | na | | | | | | | |
| $Pd_2$ $Pu_4$ | Aul | 295 | na | na | 155 | 71 | 7 | 66 | 28 | 5—6 | 138 | 62 |
| | *Rainfall Zone—VII* | .. | .. | .. | .. | .. | .. | *Rainfall Zone—* | | $D_1$ | $E_3$ ($A_2$ $B_2$) | $D_1$ $E_3$ |
| | **Keonjhar** | | | | | | | | | | | |
| $Pd_1$ | Barbil | 849 | na | na | na | | | | | | | |
| | Keonjhar | 3446 | na | na | 142 | 78 | 7 | 67 | 33 | 6—4 | 108 | 56 |
| | Champua | 701 | na | na | 172 | 79 | 7 | 89 | 36 | 6—5 | 148 | 64 |
| | Kanjipani | 1904 | na | na | na | | | | | | | |
| | **Dhenkanal** | | | | | | | | | | | |
| $Pd_1$ | Talchar | 1005 | na | na | 130 | 70 | 7 | 65 | 31 | 6—4 | 106 | 43 |
| | Pallahara | 1167 | na | na | 178 | 84 | 7 | 102 | 41 | 6—4 | 150 | 66 |
| $Pd_2$ $Mt_4$ | Angul | 2332 | na | na | 130 | 73 | 7 | 62 | 30 | 6—5 | 112 | 59 |
| $Pd_1$ | Dhenkanal | 1538 | na | na | 149 | 75 | 7 | 71 | 33 | 6—5 | 126 | 62 |
| | Kamakhya | 2239 | na | na | 143 | 75 | 7 | 69 | 33 | 6—5 | 123 | 63 |

APPENDIX 2 (*Contd.*)

| Cropping patterns | District/taluk | Geographical area (sq km) | Elevation (masl) | | Annual rainfall | | | | | *Consecutive months | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | max | min | total (cm) | rd | mmr | mr | nd | a | b | c |
| | **Koraput** | | | | | | | | | | | |
| $Pd_4\ O_4\ R_4\ Mt_4\ Pu_5$ | Koraput | 2802 | na | na | 162 | 88 | 8—7 | 86 | 42 | 6—5 | 144 | 74 |
| $Pd_4O_4R_4Pu_4$ | Bariguna | 713 | na | na | na | | | | | | | |
| $R_4O_4Pd_4Mt_4T_4$ | Nandapur (Pattangi) | 2533 | na | na | na | | | | | | | |
| $Pd_2\ O_4$ | Kotpad | 648 | na | na | na | | | | | | | |
| $Pd_2\ O_4$ | Nawrangapur | 1881 | na | na | 166 | 80 | 8 | 91 | 39 | 6—4 | 140 | 63 |
| $Pd_2\ Pu_4\ O_5$ | Umarkot | 3267 | na | | na | | | | | | | |
| | **Phulbani** | | | | | | | | | | | |
| $Pd_3\ Pu_4\ O_5Mt_5$ | Khondmals | 2018 | na | na | 151 | 77 | 7 | 75 | 35 | 6—5 | 132 | 64 |
| $Pd_3\ O_4\ Mt_4\ M_4$ | Baliguda | 4333 | na | na | 161 | 78 | 7 | 83 | 37 | 6—5 | 144 | 66 |
| | *Rainfall Zone—VIII* | .. | .. | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—$D_1$ $E_3$ ($A_2$ $B_2$) $C_1$ $E_3$* | | |
| | **Mayurbhanj** | | | | | | | | | | | |
| $Pd_2\ Pu_4$ | Karanjia | 3077 | na | na | 165 | 84 | 7 | 81 | 35 | 5—6 | 147 | 73 |
| $Pd_1$ | Rairangpur | 1908 | na | na | 165 | 81 | 7 | 87 | 36 | 6—5 | 142 | 65 |
| | **Keonjhar** | | | | | | | | | | | |
| | Anandpur | 1395 | na | na | 146 | 80 | 7 | 62 | 32 | 6—5 | 120 | 63 |
| | **Cuttack** | | | | | | | | | | | |
| $Pd_1$ | Sukinda | 1174 | na | na | 155 | 81 | 7 | 72 | 34 | 6—5 | 132 | 66 |
| $Pd_2\ Pu_4$ | Tigiria | 119 | na | na | 131 | 66 | 7 | 60 | 30 | 6—5 | 114 | 56 |
| | Jeypur | 829 | na | na | 154 | 75 | 7 | 67 | 30 | 5—6 | 138 | 66 |
| | Darpan | 885 | na | na | na | | | | | | | |
| | Solepur | 756 | na | na | 138 | 65 | 7 | 61 | 27 | 6—5 | 117 | 55 |
| | Cuttack | 725 | na | na | 154 | 76 | 8—7 | 71 | 32 | 6—5 | 132 | 63 |
| $Pd_2\ G_4$ | Athgarh | 422 | na | na | na | | | | | | | |
| $Pd_2\ Pu_4$ | Baramba | 370 | na | na | 145 | 75 | 7 | 65 | 31 | 6—5 | 123 | 61 |
| | Narsinghpur | 636 | na | na | 144 | 73 | 7 | 68 | 31 | 6—5 | 124 | 60 |
| | Banki | 513 | na | na | 143 | 72 | 7 | 64 | 30 | 6—5 | 123 | 59 |
| | **Kalahandi** | | | | | | | | | | | |
| | Lanjigarh | 2689 | na | na | na | | | | | | | |
| | **Puri** | | | | | | | | | | | |
| | Khandpara | 622 | na | na | 146 | 82 | 7 | 66 | 33 | 6—5 | 123 | 65 |
| $Pd_2\ Pu_4$ | Daspilla | 1367 | na | na | 146 | 83 | 8—7 | 63 | 35 | 6—5 | 122 | 67 |
| | **Dhenkanal** | | | | | | | | | | | |
| $Pd_2O_4Pu_5$ | Hindol | 822 | na | na | 146 | 78 | 7 | 65 | 33 | 6—5 | 124 | 63 |
| | *Rainfall Zone—IX* | .. | .. | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—$D_1$ $E_3$ ($A_2$ $B_2$) $C_1$ $D_1$ $E_2$* | | |
| | **Cuttack** | | | | | | | | | | | |
| $Pd_2\ Pu_4$ | Niali | 323 | na | na | na | | | | | | | |
| $Pd_1$ | Jagatsinghpur | 768 | na | na | 170 | 72 | 7 | 75 | 30 | 6—5 | 144 | 60 |
| | **Puri** | | | | | | | | | | | |
| | Bhubaneshwar | 935 | na | na | 148 | 67 | 7 | 66 | 29 | 6—5 | 128 | 57 |
| | Khurda | 997 | na | na | 161 | 74 | 7 | 72 | 31 | 6—5 | 138 | 62 |
| $Pd_2\ Pu_4$ | Pipli | 388 | na | na | 192 | 69 | 7 | 85 | 30 | 6—5 | 167 | 60 |
| $Pd_2\ Pu_4/G4$ | Rampur | 523 | na | na | 152 | 75 | 7 | 62 | 31 | 6—5 | 128 | 62 |
| $Pd_3\ Pu_4$ | Nimapara | 960 | na | na | na | | | | | | | |

APPENDIX 2 (*Concld.*)

| Cropping pattern | District/taluk | Geographical area (sq km) | Elevation (masl) | | Annual rainfall | | | | | *Consecutive months | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | max | min | total (cm) | rd | mmr | mr | nd | a | b | c |
| | *Rainfall Zone—X* .. .. .. .. | | | | .. .. .. .. | | | *Rainfall Pattern—* | | $D_1$ | $E_3$ ($A_3$ $B_1$) | $D_1$ $E_3$ |
| | **Koraput** | | | | | | | | | | | |
| $Pd_2$ $R_4$ | Jeypore | 1842 | na | na | 194 | 90 | 8 | 107 | 44 | 6—5 | 176 | 77 |
| $Pd_1$ | Motu | 2626 | na | na | na | | | | | | | |
| | Malkagiri | 3300 | na | na | 167 | 83 | 8 | 92 | 41 | 6—5 | 154 | 72 |
| | *Rainfall Zone—XI* .. .. .. .. | | | | .. .. .. .. | | | *Rainfall Pattern—* | | $D_2$ | $E_2$ ($B_4$) | $C_1$ $D_1$ $E_2$ |
| | **Ganjam** | | | | | | | | | | | |
| $Pd_3$ $Pu_4$ $R_4$ | R. Udayagiri | 2359 | na | na | 155 | 84 | 8 | 58 | 31 | 5—6 | 135 | 71 |
| $Pd_3$ $Pu_4$ | Surada | 945 | na | na | 149 | 76 | 8 | 55 | 27 | 6—5 | 119 | 48 |
| | *Rainfall Zone—XII* | | | | | | | *Rainfall Pattern—* | | $C_1$ | $D_1$ $E_2$ ($A_2$ $B_2$) | $C_1$ $E_3$ |
| | **Balasore** | | | | | | | | | | | |
| $Pd_1$ | Chandhali | 582 | na | na | 171 | 76 | 7 | 75 | 31 | 5—6 | 152 | 66 |
| | Dhamnagar | 612 | na | na | | | | | | | | |
| | Bhadrak | 1593 | na | na | 153 | 78 | 7 | 63 | 31 | 5—6 | 135 | 71 |
| | Soro | 1041 | na | na | 194 | 80 | 7 | 78 | 30 | 5—6 | 170 | 68 |
| | Balasore | 588 | na | na | 159 | 77 | 7—8 | 62 | 29 | 6—5 | 129 | 60 |
| | Nilgiri | 681 | na | na | 173 | 84 | 7—8 | 68 | 32 | 5—6 | 151 | 71 |
| | **Mayurbhanj** | | | | | | | | | | | |
| | Betnoti | 989 | na | na | na | | | | | | | |
| | Udala | 1239 | na | na | na | | | | | | | |
| | Baripada | 3203 | na | na | 165 | 83 | 7 | 72 | 34 | 5—6 | 147 | 72 |

## APPENDIX 3

### Area under Principal Crops (1969-70)

ORISSA

(Thousand hectares)

| District/ taluk | Gross cropped area | pd | Jk | Jr | B | M | R | W | Ba | Mt | G | T | Pu | S | Gn | O | C | L | F | Misc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Rainfall Zone—I* | .. | .. | .. | .. | .. | .. | .. | .. | *Rainfall Pattern—$E_4(A_2B_2)D_1E_3$* | | | | | | | | | | |
| **Sundargarh** | | | | | | | | | | | | | | | | | | | | |
| Sundargarh | 67 | 58 (87) | 0·2 (0·4) | — (—) | — (—) | 0·2 (0·4) | 0·2 (0·4) | 0·2 (0·4) | — (—) | 1 (1) | 1 (1) | 0·2 (0·4) | 2 (3) | 0·4 (1) | 0·4 (1) | 1 (1) | — (—) | — (—) | — (—) | 2 (3) |
| Rajgangpur | 53 | 40 (75) | 1 (1) | — (—) | 0·1 (0·2) | 1 (1) | 0·3 (1) | 0·2 (0·4) | — (—) | 2 (4) | 1 (2) | 1 (2) | 2 (5) | 0·2 (0·3) | 0·1 (0·2) | 2 (4) | 0·1 (0·1) | — (—) | — (—) | 2·0 (3·7) |
| Hemgir | 34 | 26 (78) | 0·1 (0·4) | 1 (3) | — (—) | 0·1 (1) | 0·1 (0·3) | 0·1 (0·3) | — (—) | 1 (2) | — (—) | 0·1 (0·4) | 2 (6) | 0·1 (0·4) | 0·4 (1) | 0·4 (1) | — (—) | — (—) | — (—) | 2·6 (7·6) |
| Kurmunda | 131 | 90 (69) | 1 (1) | — (—) | — (—) | 1 (1) | 2 (1) | 0·3 (0·2) | — (—) | 7 (6) | 2 (1) | 4 (3) | 8 (6) | — (—) | 0·1 (0·1) | 3 (2) | — (—) | — (—) | — (—) | 12·6 (9·6) |
| Bonai | 43 | 34 (79) | 0·4 (1) | — (—) | 0·1 (0·1) | 1 (2) | 0·3 (1) | 0·3 (1) | — (—) | 1 (1) | 1 (1) | 0·4 (1) | 2 (4) | 0·2 (0·4) | 0·1 (0·1) | 2 (4) | — (—) | — (—) | — (—) | 2 (4·6) |
| **Sambalpur** | | | | | | | | | | | | | | | | | | | | |
| Jharsuguda | 72 | 63 (88) | — (—) | — (—) | — (—) | — (—) | 0·1 (0·1) | 0·4 (1) | — (—) | 1 (2) | — (—) | — (—) | 2 (3) | 1 (1) | 1 (1) | 1 (1) | — (—) | — (—) | — (—) | 2·5 (3·4) |
| Sambalpur | 102 | 90 (88) | — (—) | — (—) | — (—) | 0·2 (0·1) | — (—) | 1 (1) | — (—) | 1 (1) | — (—) | 0·2 (0·2) | 3 (3) | 0·4 (0·4) | 1 (1) | 1 (1) | — (—) | — (—) | — (—) | 4·2 (4·1) |
| Bargarh | 195 | 170 (88) | — (—) | — (—) | — (—) | — (—) | — (—) | 1 (0·4) | — (—) | — (—) | 1 (0·4) | — (—) | 3 (2) | 2 (1) | 9 (4) | 0·4 (0·2) | — (—) | — (—) | — (—) | 8·6 (4·4) |
| Padampur | 139 | 108 (77) | 0·1 (0·1) | — (—) | — (—) | 0·3 (0·2) | 0·1 (0·1) | 0·1 (0·1) | — (—) | 8 (6) | — (—) | — (—) | 7 (5) | 0·4 (0·3) | 8 (6) | 2 (1) | — (—) | — (—) | — (—) | 5·0 (3·6) |
| Rairakhol | 26 | 20 (76) | — (—) | — (—) | — (—) | 0·3 (1) | — (—) | — (—) | — (—) | 1 (4) | — (—) | 0·1 (0·4) | 3 (12) | 0·1 (0·4) | — (—) | 1 (4) | — (—) | — (—) | — (—) | 0·5 (2) |
| Deogarh | 43 | 33 (77) | — (—) | — (—) | — (—) | 0·1 (0·3) | — (—) | — (—) | — (—) | 1 (0·4) | — (—) | 0·1 (0·2) | 4 (9) | 0·3 (1) | 0·2 (0·4) | 1 (2) | — (—) | — (—) | — (—) | 4·3 (10·0) |
| Kuchinda | 44 | 33 (75) | 0·1 (0·2) | — (—) | — (—) | 0·2 (0·4) | 0·2 (0·4) | 1 (2) | — (—) | 1 (1) | 0·1 (0·2) | 0·1 (0·3) | 4 (9) | 0·1 (0·2) | 0·4 (1) | 1 (2) | — (—) | — (—) | — (—) | 3·8 (8·6) |
| **Dhenkanal** | | | | | | | | | | | | | | | | | | | | |
| Athmallik | 53 | 33 (62) | — (—) | — (—) | — (—) | 1 (2) | 1 (2) | 0·1 (0·2) | — (—) | 1 (2) | — (—) | 1 (2) | 9 (16) | 0·3 (1) | 1 (2) | 4 (7) | — (—) | — (—) | — (—) | 1·6 (3) |
| **Phulbani** | | | | | | | | | | | | | | | | | | | | |
| Baudh | 72 | 51 (70) | 0·2 (0·1) | — (—) | — (—) | 1 (1) | 0·4 (1) | 0·2 (0·2) | — (—) | 2 (3) | 0·4 (1) | 1 (1) | 6 (8) | 2 (3) | 0·1 (0·2) | 6 (8) | — (—) | — (—) | — (—) | 1·7 (2·4) |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bolangir** | | | | | | | | | | | | | | | | | | | | |
| Bolangir | 140 | 78 (56) | 0·1 (0·1) | — (—) | — (—) | 1 (0·4) | 1 (1) | 1 (0·4) | — (—) | 11 (8) | 4 (3) | 2 (1) | 15 (11) | 2 (1) | 3 (2) | 6 (5) | — (—) | — (—) | — (—) | 16·0 (11·4) |
| Sonepur | 81 | 68 (84) | — (—) | — (—) | — (—) | 0·2 (0·3) | 0·1 (0·1) | 0·2 (0·3) | — (—) | 1 (1) | 1 (1) | 1 (1) | 2 (3) | 1 (1) | 1 (1) | 1 (2) | — (—) | — (—) | — (—) | 4·5 (5·5) |
| Birmaharajpur | 52 | 36 (69) | — (—) | — (—) | — (—) | 0·1 (0·1) | 0·1 (0·1) | 0·1 (0·2) | — (—) | 1 (2) | 2 (4) | 1 (2) | 6 (12) | 1 (2) | 0·1 (0·1) | 1 (3) | — (—) | — (—) | — (—) | 3·2 (6) |
| Patnagarh | 112 | 62 (55) | — (—) | — (—) | — (—) | 1 (1) | 2 (2) | 0·3 (0·3) | — (—) | 8 (7) | 2 (2) | 0·2 (0·2) | 16 (15) | 0·4 (0·4) | 2 (2) | 8 (7) | — (—) | — (—) | — (—) | 9·6 (8·5) |
| Titlagarh | 126 | 83 (66) | — (—) | — (—) | 0·2 (0·2) | 1 (1) | 5 (4) | 0·4 (0·3) | — (—) | 8 (7) | 2 (1) | 0·2 (0·2) | 11 (9) | 1 (1) | 0·3 (0·3) | 4 (3) | — (—) | — (—) | — (—) | 9·0 (2·1) |
| **Kalahandi** | | | | | | | | | | | | | | | | | | | | |
| Kalahandi | 61 | 35 (58) | 0·2 (0·4) | — (—) | — (—) | 2 (4) | 4 (7) | 0·3 (1) | — (—) | 9 (16) | 1 (1) | 2 (3) | 2 (3) | 0·1 (0·1) | — (—) | 4 (5) | — (—) | — (—) | — (—) | 1·4 (2) |
| Dharamgarh | 70 | 37 (53) | 0·4 (1) | — (—) | — (—) | 1 (2) | 2 (3) | 0·2 (0·3) | — (—) | 3 (5) | 0·4 (1) | 0·4 (1) | 11 (16) | 1 (2) | 0·4 (1) | 5 (7) | — (—) | — (—) | — (—) | 6·4 (8) |
| Jaipatna | 96 | 61 (63) | 0·4 (0·4) | — (—) | — (—) | 1 (1) | 2 (2) | 0·2 (0·2) | — (—) | 4 (4) | 1 (1) | 1 (1) | 11 (12) | 0·4 (0·4) | 0·4 (1) | 6 (7) | — (—) | — (—) | — (—) | 7·6 (7·9) |
| Nawapara | 148 | 92 (62) | 0·1 (0·1) | — (—) | — (—) | 2 (1) | 4 (3) | 0·2 (0·1) | — (—) | 22 (15) | 3 (2) | 0·4 (0·3) | 10 (7) | 1 (0·4) | 0·3 (0.2) | 6 (4) | — (—) | — (—) | — (—) | 7·0 (4·7) |
| **Koraput** | | | | | | | | | | | | | | | | | | | | |
| Kashipur | 25 | 6 (23) | 1 (5) | — (—) | 0·2 (1) | 3 (12) | 4 (16) | — (—) | — (—) | 1 (4) | 0·1 (0·4) | 1 (3) | 1 (6) | 0·1 (0·4) | — (—) | 6 (23) | — (—) | — (—) | — (—) | 1·6 (6·4) |
| | *Rainfall Zone—II* | | | .. | | .. | | .. | | .. | | .. | | *Rainfall Pattern* $D_1$ $E_3$ $(C_4)$ $C_1$ $D_1$ $E_2$ | | | | | | | |
| **Ganjam** | | | | | | | | | | | | | | | | | | | | |
| Chatrapur | 65 | 33 (51) | — (—) | — (—) | — (—) | 0·2 (0·3) | 5 (7) | — (—) | — (—) | 0·1 (0·1) | 5 (7) | 0·3 (1) | 14 (21) | 0·3 (0·4) | 5 (5) | 1 (2) | — (—) | — (—) | — (—) | 3·1 (4·7) |
| | *Rainfall Zone—III* | | | .. | | .. | | .. | | .. | | .. | | *Rainfall Pattern—*$D_1E_3$ $(B_3C_1)$ $C_1E_3$ | | | | | | | |
| **Koraput** | | | | | | | | | | | | | | | | | | | | |
| Gunupur | 53 | 6 (12) | 1 (2) | — (—) | 0·4 (1) | 1 (1) | 2 (4) | — (—) | — (—) | 7 (13) | — (—) | 3 (6) | 4 (8) | 0·2 (0·3) | 1 (1) | 3 (6) | — (—) | — (—) | — (—) | 24·4 (46) |
| Bissam Cuttack | 37 | 14 (38) | 2 (5) | — (—) | 0·4 (1) | 1 (3) | 4 (10) | 0·1 (0·2) | — (—) | 2 (6) | 0·1 (0·1) | 1 (3) | 2 (6) | 0·2 (1) | 0·3 (1) | 6 (16) | — (—) | — (—) | — (—) | 4 (10) |
| Rayagada | 44 | 9 (21) | 2 (4) | — (—) | 1 (1) | 1 (3) | 6 (14) | 0·1 (0·1) | — (—) | 4 (9) | 0·1 (0·1) | 3 (6) | 5 (12) | 2 (5) | 1 (2) | 7 (15) | — (—) | — (—) | — (—) | 3·3 (7·6) |

Pd=Paddy
JK=Jowar Kharif
Jr=Jowar rabi
B=bajra

M=Maize
R=ragi
W=Wheat
Ba=barley
Mt=millets

G=gram
T=tur
Pu=other pulses
S=surgarcane
Gn=groundnut

O—other oilseeds
C=cotton
L=plantations
F=fodder
Misc.=miscellaneous crops

=nil or negligible

NOTES :
1. Figures in brackets represent percentages to gross cropped area.
2. The percentage figures have been rounded off individually and hence cross totals may not, in some cases, add upto 100.

APPENDIX 3 (*Contd.*)

(000'hs)

| District/taluk | Gross cropped area | Pd | Jk | Jr | B | M | R | W | Ba | Mt | G | T | Pu | S | Gn | O | C | L | F | Misc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Rainfall Zone IV—(contd.)* | | | | | | | | | | | | | *Rainfall Pattern—$D_1E_3$ ($B_3C_1$) $C_1D_1E_2$* | | | | | | |
| **Phulbani** | | | | | | | | | | | | | | | | | | | | |
| G. Udaygiri | 41 | 18 | 0·4 | — | — | 4 | 1 | — | — | 3 | 0·3 | 3 | 2 | — | 1 | 5 | — | — | — | 3·6 |
| | | (44) | (0·3) | (—) | (—) | (9) | (2) | (—) | (—) | (8) | (1) | (8) | (5) | (—) | (2) | (12) | (—) | (—) | (—) | (8·6) |
| **Ganjam** | | | | | | | | | | | | | | | | | | | | |
| Ghumusur | 93 | 53 | 0·1 | — | — | 1 | 6 | 0·1 | — | 1 | 0·1 | 1 | 20 | 1 | 1 | 4 | — | — | — | 4·8 |
| | | (57) | (0·1) | (—) | (—) | (1) | (6) | (0·1) | (—) | (1) | (0·2) | (1) | (22) | (1) | (1) | (4) | (—) | (—) | (—) | (5·1) |
| Aska | 62 | 29 | — | — | — | 0·1 | 3 | — | — | 0·2 | — | 0·3 | 19 | 1 | 1 | 2 | — | — | — | 6·6 |
| | | (47) | (—) | (—) | (—) | (0·2) | (4) | (—) | (—) | (0·3) | (—) | (0·4) | (3 ) | (1) | (1) | (4) | (—) | (—) | (—) | (10·6) |
| Digapahandy | 91 | 46 | — | — | — | 0·3 | 6 | 0·1 | — | 1 | 5 | 0·4 | 19 | 1 | 1 | 4 | — | — | — | 7·2 |
| | | (51) | (—) | (—) | (—) | (0·3) | (7) | (0·1) | (—) | (1) | (6) | (0·4) | (20) | (1) | (1) | (5) | (—) | (—) | (—) | (7·9) |
| Chikiti | 23 | 12 | — | — | 0·1 | 0·1 | 2 | — | — | 1 | — | 0·2 | 5 | — | — | 2 | — | — | — | 1 |
| | | (51) | (—) | (—) | (0·4) | (0·4) | (7) | (—) | (—) | (4) | (—) | (1) | (23) | (—) | (—) | (8) | (—) | (—) | (—) | (4) |
| Berhampur | 25 | 12 | — | — | — | — | 2 | — | — | — | — | — | 7 | — | 0·4 | 2 | — | — | — | 1·8 |
| | | (49) | (—) | (—) | (—) | (—) | (9) | (—) | (—) | (—) | (—) | (—) | (26) | (—) | (2) | (6) | (—) | (—) | (—) | (7·2) |
| Kodala | 115 | 59 | 0·3 | — | — | 0·2 | 7 | — | — | 0·2 | — | 0·3 | 29 | 0·4 | 5 | 2 | — | — | — | 11·6 |
| | | (51) | (0·2) | (—) | (—) | (0·2) | (6) | (—) | (—) | (0·2) | (—) | (0·3) | (25) | (0·4) | (4) | (2) | (—) | (—) | (—) | (10·1) |
| Parlakhemundi | 47 | 24 | 0·1 | — | 0·2 | 0·3 | 4 | — | — | 1 | 0·4 | 0·2 | 5 | 1 | 1 | 3 | — | — | — | 6·4 |
| | | (51) | (0·3) | (—) | (0·3) | (0·1) | (8) | (—) | (—) | (2) | (1) | (0·4) | (11) | (2) | (2) | (8) | (—) | (—) | (—) | (13.0) |
| **Puri** | | | | | | | | | | | | | | | | | | | | |
| Puri | 97 | 60 | — | — | — | — | 0·4 | 0·2 | — | — | — | — | 28 | — | — | 2 | — | — | — | 6·4 |
| | | (62) | (—) | (—) | (— | (—) | (0·4) | (0·2) | (—) | (—) | (—) | (—) | (29) | (—) | (—) | (2) | (—) | (—) | (—) | (6.6) |
| Banpur | 48 | 34 | — | — | — | 0·2 | 1 | — | — | 0·1 | 6 | 0·1 | 3 | — | 0·2 | 0·4 | — | — | — | 3·0 |
| | | (72) | (—) | (—) | (—) | (0·3) | (2) | (—) | (—) | (0·2) | (13) | (0·3) | (5) | (—) | (0·4) | (1) | (—) | (—) | (—) | (6) |
| Krishnaprasad | 5 | 4 | — | — | — | — | 0·2 | — | — | 0·1 | — | — | — | — | — | — | — | — | — | 1·1 |
| | | (76) | (—) | (—) | (—) | (—) | (3) | (—) | (—) | (1) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (20) |
| | *Rainfall Zone—V* | | | | | | | | | | | | | | *Rainfall Pattern—$D_1E_3(B_4)C_1E_3$* | | | | | |
| **Balasore** | | | | | | | | | | | | | | | | | | | | |
| Jaleshwar | 63 | 50 | — | — | — | 0·1 | — | — | — | 4 | — | — | 3 | 0·2 | — | 1 | — | — | — | 5·1 |
| | | (79) | (—) | (—) | (—) | (0·2) | (—) | (—) | (—) | (6) | (—) | (—) | (5) | (0·2) | (—) | (—) | (—) | (—) | (—) | (8·0) |
| Basta | 43 | 36 | 0·2 | — | — | 0·1 | — | 0·1 | — | — | — | — | 2 | 0·2 | — | 1 | — | — | — | 3·8 |
| | | (84) | (0·4) | (—) | (—) | (0·2) | (—) | (0·2) | (—) | (—) | (—) | (—) | (4) | (0·4) | (—) | (2) | (—) | (—) | (—) | (9) |
| **Puri** | | | | | | | | | | | | | | | | | | | | |
| Nayagarh | 59 | 37 | — | — | — | 0·4 | 2 | 0·1 | — | 0·1 | 6 | 0·2 | 7 | 2 | 0·4 | 2 | — | — | — | 2·2 |
| | | (61) | (—) | (—) | (—) | (1) | (3) | (0·2) | (—) | (0·1) | (10) | (0·4) | (12) | (3) | (1) | (4) | (—) | (—) | (—) | (4) |
| | *Rainfall Zone—VI* | | | | | | | | | | | | | | *Rainfall Pattern—$D_1E_3(A_1B_3)C_1E_3$* | | | | | |
| **Cuttack** | | | | | | | | | | | | | | | | | | | | |
| Kunjang | 76 | 52 | — | — | — | — | 1 | — | — | — | — | — | 16 | — | 0·4 | 0·3 | — | — | — | 6·3 |
| | | (69) | (—) | (—) | (—) | (—) | (1) | (—) | (—) | (—) | (—) | (—) | (21) | (—) | (1) | (0·4) | (—) | (—) | (—) | (8·0) |
| Kendrapara | 45 | 31 | — | — | — | — | 0·1 | — | — | — | — | — | 5 | — | 0·2 | 0·2 | — | — | — | 8·5 |
| | | (68) | (—) | (—) | (—) | (—) | (0·2) | (—) | (—) | (—) | (—) | (—) | (12) | (—) | (0·4) | (0·4) | (—) | (—) | (—) | (18·8) |
| Kanika | 24 | 16 | — | — | — | — | 0·1 | 0·1 | — | 0·1 | — | — | 3 | — | 0·2 | 0·2 | — | — | — | 4·3 |
| | | (69) | (—) | (—) | (—) | (—) | (0·2) | (0·3) | (—) | (0·4) | (—) | (—) | (11) | (—) | (1) | (1) | (—) | (—) | (—) | (17·2) |

*Rainfall Zone—VII* .. .. .. .. .. .. .. .. .. .. .. *Rainfall Pattern—$D_1E_3(A_1B_3)C_1E_3$*

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Patamundai | 51 | 43 | — | — | — | — | 0·1 | 0.1 | — | — | — | — | — | 4 | — | 0·3 | 0·3 | — | — | — | 3·2 |
| | | (84) | (—) | (—) | (—) | (—) | (0·1) | (0·2) | (—) | (—) | (—) | (—) | (—) | (8) | (—) | (1) | (1) | (—) | (—) | (—) | (6) |
| Aul | 24 | 16 | — | — | — | 0·1 | 0·1 | 0·2 | — | — | — | — | — | 4 | — | 0·4 | 0·3 | — | — | — | 3·1 |
| | | (64) | (—) | (—) | (—) | (0·3) | (0·3) | (1) | (—) | (—) | (—) | (—) | (—) | (18) | (—) | (2) | (1) | (—) | (—) | (—) | (13·0) |
| Marsaghai | 54 | 37 | — | — | — | — | 0·4 | — | — | — | — | — | — | 7 | — | 0·4 | 1 | — | — | — | 8·0 |
| | | (67) | (—) | (—) | (—) | (—) | (1) | (—) | (—) | (—) | (—) | (—) | (—) | (13) | (—) | (1) | (2) | (—) | (—) | (—) | (16)* |
| **Keonjhar** | | | | | | | | | | | | | | | | | | | | | |
| Barbil | 14 | 10 | 0·4 | — | — | 1 | 0·1 | — | — | 0·4 | 0·2 | 0·2 | 1 | — | — | 0·4 | — | — | — | 0·3 |
| | | (73) | (3) | (—) | (—) | (5) | (1) | (—) | (—) | (3) | (2) | (1) | (6) | (—) | (—) | (3) | (—) | (—) | (—) | (2·1) |
| Keonjhar | 25 | 19 | 0·1 | — | — | 1 | 0·1 | 0·1 | — | 0·3 | 0·4 | 0·2 | 1 | — | 0·1 | 1 | — | — | — | 1·7 |
| | | (76) | (0·2) | (—) | (—) | (5) | (0·4) | (0·3) | (—) | (1) | (2) | (1) | (4) | (—) | (1) | (2) | (—) | (—) | (—) | (6·8) |
| Champua | 60 | 52 | 0·2 | — | — | 1 | 0·2 | — | — | 0·3 | 0·2 | 0·2 | 1 | — | — | 0·4 | — | — | — | 4·5 |
| | | (86) | (0·4) | (—) | (—) | (2) | (0·4) | (—) | (—) | (0·4) | (0·4) | (0·4) | (2) | (—) | (—) | (1) | (—) | (—) | (—) | (7·5) |
| Kanjipani | 99 | 74 | 0·3 | — | — | 4 | 0·2 | 0·1 | — | 2 | 0·2 | 1 | 4 | 0·1 | 0·3 | 9 | — | — | — | 3·3 |
| | | (75) | (0·3) | (—) | (—) | (4) | (0·2) | (0·1) | (—) | (2) | (0·2) | (1) | (4) | (0·1) | (0·3) | (8) | (—) | (—) | (—) | (3 |
| **Dhenkanal** | | | | | | | | | | | | | | | | | | | | | |
| Angul | 93 | 53 | — | — | — | 1 | 1 | — | — | 10 | 0·3 | 1 | 7 | 1 | 6 | 4 | — | | — | 8·4 |
| | | (57) | (—) | (—) | (—) | (1) | (1) | (—) | (—) | (11) | (0·3) | (1) | (8) | (1) | (6) | (5) | (—) | (—) | (—) | (9·0) |
| Talcher | 39 | 29 | — | — | — | 0·4 | 0·2 | — | — | 1 | 0·1 | 0·2 | 2 | 0·3 | 1 | 2 | — | — | — | 2·8 |
| | | (74) | (—) | (—) | (—) | (1) | (0·4) | (—) | (—) | (2) | (0·2) | (1) | (6) | (1) | (2) | (5) | (—) | (—) | | (7·2) |
| Pallahara | 4 | 3 | — | — | — | 0·1 | — | — | — | 0·2 | 0·1 | 0·1 | — | 0·1 | 0·1 | 0·1 | — | — | — | 0·3 |
| | | (73) | (—) | (—) | (—) | (2) | (—) | (—) | (—) | (0·3) | (2) | (2) | (1) | (2) | (2) | (2) | (—) | (—) | (—) | (7) |
| Dhenkanal | 80 | 56 | — | — | — | 0·4 | 0·2 | 0·1 | — | 1 | — | 1 | 12 | 0·4 | 1 | 4 | — | — | — | 4·1 |
| | | (70) | (—) | (—) | (—) | (1) | (0·3) | (0·1) | (—) | (1) | (—) | (1) | (15) | (1) | (2) | (5) | (—) | (—) | (—) | (5·1) |
| Kamakhya | 75 | 52 | — | — | — | 0·3 | 0·2 | — | — | 0·4 | — | 0·4 | 14 | 0·4 | 0·4 | 2 | — | — | — | 5 |
| | | (68) | (—) | (—) | (—) | (0·4) | (0·2) | (— | — | (1) | (—) | (1) | (19) | (1) | (1) | (2) | (—) | (—) | (—) | (6) |
| **Koraput** | | | | | | | | | | | | | | | | | | | | | |
| Koraput | 81 | 15 | 6 | — | 1 | 3 | 13 | — | — | 6 | — | 2 | 6 | 0·2 | 0·3 | 13 | — | — | — | 15·5 |
| | | (19) | (7) | (—) | (1) | (4) | (16) | (—) | (—) | (7) | (—) | (3) | (7) | (0·2) | (0·3) | (6) | (—) | (—) | (—) | (19) |
| Nandapur (Pattangi) | 57 | 10 | 0·3 | — | 2 | 3 | 14 | 0·1 | — | 6 | 0·1 | 6 | 1 | 0·3 | 0·2 | 10 | — | — | — | 4 |
| | | (16) | (1) | (—) | (3) | (5) | (25) | (0·1) | (—) | (10) | (0·1) | (10) | (2) | (1) | (0·2) | (20) | (1) | (—) | (—) | (7) |
| Boriguna | 18 | 5 | — | — | — | — | 3 | 0·1 | — | 1 | 0·3 | 0·4 | 2 | 1 | — | 4 | — | — | — | 1·6 |
| | | (30) | (—) | (—) | (—) | (—) | (16) | (1) | (—) | (3) | (2) | (2) | (11) | (6) | (—) | (19) | (—) | — | —) | (10) |
| Kotpad | 25 | 14 | 0·3 | — | — | 0·3 | 1 | 0·1 | — | 2 | 0·1 | 0·3 | 1 | 1 | — | 3 | — | — | — | 1·4 |
| | | (56) | (1) | (—) | (—) | (1) | (3) | (0·4) | (—) | (7) | (0·4) | (1) | (3) | (2) | (—) | (10) | (—) | (—) | (—) | (5·6) |
| Nowrangapur | 68 | 37 | 0·1 | — | — | 0·2 | 1 | 0·3 | — | 3 | 0·4 | 1 | 4 | 3 | — | 10 | — | — | — | 7·6 |
| | | (54) | (0·3) | (—) | (—) | (0·3) | (3) | (0·4) | (—) | (5) | (1) | (1) | (6) | (5) | (—) | (14) | (—) | (—) | (—) | (11) |
| Umarkot | 73 | 40 | 1 | — | — | 4 | 5 | 0·4 | — | 3 | 1 | 1 | 6 | 1 | 0·1 | 6 | — | — | — | 4·5 |
| | | (55) | (1) | (—) | (—) | (5) | (6) | (1) | (—) | (4) | (2) | (2) | (8) | (2) | (0·2) | (7) | (—) | (—) | (—) | (6·1) |
| **Phulbani** | | | | | | | | | | | | | | | | | | | | | |
| Khondmals | 34 | 16 | 0·1 | — | — | 2 | 1 | — | — | 2 | — | 1 | 4 | — | 0·1 | 3 | — | — | — | 5·2 |
| | | (47) | (0·4) | (—) | (—) | (6) | (3) | (—) | (—) | (6) | (—) | (3) | (11) | (—) | (0·2) | (7) | (—) | (—) | (—) | (16) |
| Baliguda | 78 | 24 | 0·4 | — | 0·2 | 7 | 6 | — | 1 | 12 | 2 | 4 | 5 | — | — | 10 | — | — | — | 6·8 |
| | | (31) | (1) | (—) | (0·3) | (9) | (7) | (—) | (1) | (15) | (3) | (5) | (6) | (—) | (—) | (12) | (—) | (— | (—) | (19) |

*includes jute which accounts for about 13 percent of cropped area.
**includes jute which accounts for about 9 percent of cropped area.

APPENDIX 3 (*Contd.*)

'000(ha)

| District/taluk | Gross cropped area | Pd | Jk | Jr | B | M | R | W | Ba | Mt | G | T | Pu | S | Gn | O | C | L | F | Misc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Rainfall Zone—VIII* | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | *Rainfall Pattern—$D_1E_3(A_2B_2)C_1E_3$* | | | | | | |
| **Mayurbhanj** | | | | | | | | | | | | | | | | | | | | |
| Karanjia | 95 | 66 | 0·2 | — | — | 2 | 0·3 | 0·3 | — | 2 | 2 | 1 | 7 | | 2 | 8 | — | — | — | 4·6 |
| | | (70) | (0·2) | (—) | (—) | (2) | (0·3) | (0·3) | (—) | (2) | (2) | (1) | (8) | (—) | (2) | (7) | (—) | (—) | (—) | (5) |
| Rairangpur | 104 | 83 | — | — | — | 1 | — | 0·3 | — | 1 | 1 | 1 | 5 | — | 0·3 | 3 | — | — | — | 8·4 |
| | | (81) | (—) | (—) | (—) | (1) | (—) | (0·3) | (—) | (1) | (1) | (1) | (4) | (—) | (0·3) | (3) | (—) | (—) | (—) | (8·0) |
| **Keonjhar** | | | | | | | | | | | | | | | | | | | | |
| Anandapur | 64 | 52 | 0·1 | — | — | 1 | 1 | — | — | 0·1 | 0·1 | 0·3 | 3 | 0·3 | — | 1 | — | — | — | 5·1 |
| | | (81) | (0·2) | (—) | (—) | (1) | (2) | (—) | (—) | (0·2) | (0·1) | (0·1) | (5) | (0·4) | (—) | (1) | (—) | (—) | (—) | (8) |
| **Cuttack** | | | | | | | | | | | | | | | | | | | | |
| Sukinda | 68 | 52 | 0·1 | — | — | 1 | — | — | — | — | 2 | 1 | 4 | 0·3 | — | 0·2 | — | — | — | 6·8 |
| | | (77) | (0.2) | (—) | (—) | (2) | (—) | (—) | (—) | (—) | (3) | (1) | (6) | (0.4) | — | (0.3) | (—) | (—) | (—) | (10·0) |
| Jaipur | 92 | 59 | — | — | — | 0·1 | 1 | 0·1 | — | 0·2 | — | 0·4 | 20 | 1 | 1 | 1 | — | — | — | 8·2 |
| | | (64) | (—) | (—) | (—) | (0·1) | (1) | (0·1) | (—) | (0·2) | (—) | (0·4) | (22) | (1) | (1) | (1) | (—) | (—) | (—) | (9·0) |
| Darpan | 81 | 45 | — | — | — | 0·1 | 0·2 | 0·2 | — | 0·1 | 1 | 1 | 19 | 1 | 1 | 1 | — | — | — | 11·8 |
| | | (56) | (—) | (—) | (—) | (0·1) | (0·3) | (0·3) | (—) | (0·2) | (1) | (1) | (23) | (1) | (1) | (1) | (—) | (—) | (—) | (15·0) |
| Salepur | 46 | 29 | — | — | — | — | — | — | — | — | — | — | 9 | — | 1 | — | — | — | — | 7·0* |
| | | (64) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (19) | (—) | (2) | (—) | (—) | (—) | (—) | (15·1) |
| Cuttack | 60 | 39 | — | — | — | 0·1 | 0·3 | 0·1 | — | — | — | 0·3 | 12 | 0·1 | 0·4 | 0·4 | — | — | — | 12·0 |
| | | (56) | (—) | (—) | (—) | (0·2) | (0·4) | (0·2) | (—) | (—) | (—) | (1) | (20) | (0·2) | (1) | (1) | (—) | (—) | (—) | (20·8) |
| Athgarh | 26 | 15 | — | — | — | 0·2 | 0·2 | — | — | — | 4 | 0·1 | 2 | 0·2 | 0·3 | 0·3 | —7 | — | — | 3·6 |
| | | (59) | (—) | (—) | (—) | (1) | (1) | (—) | (—) | (—) | 15 | (0.4) | (7) | (1) | (1) | (1) | (1) | (—) | (—) | (13·8) |
| Tigiria | 8 | 5 | — | — | — | — | — | — | — | — | — | (—) | (1) | 0.3 | 0.2 | — | — | — | — | 1 |
| | | (67) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (1) | (15) | (3) | (2) | (—) | (—) | (—) | (—) | 10·1 |
| Baramba | 21 | 12 | — | — | — | — | 0·2 | — | — | — | — | 0·1 | 6 | 1 | 0·4 | 0·3 | — | — | — | 1·4 |
| | | (56) | (—) | (—) | (—) | (—) | (1) | (—) | (—) | (—) | (—) | (0·4) | (28) | (4) | (2) | (2) | (—) | (—) | (—) | 7 |
| Banki | 29 | 17 | — | — | — | — | 0·2 | 0·1 | — | 0·1 | 0·2 | 0·1 | 5 | 1 | 0·4 | 0·3 | — | — | — | 4.6 |
| | | (52) | (—) | (—) | (—) | (—) | (1) | (0·2) | (—) | (0·3) | (1) | (0·2) | (15) | (2) | (1) | (1) | — | (—) | (—) | (15·8) |
| Narsinghpur | 20 | 10 | — | — | — | — | 0·4 | — | — | — | — | 0·3 | 4 | 1 | 0·2 | 1 | — | — | — | 3·5 |
| | | (53) | (—) | (—) | (—) | (—) | (2) | (—) | (—) | (—) | (—) | (2) | (18) | (3) | (1) | (4) | (—) | (—) | (—) | (17) |
| **Dhenkanal** | | | | | | | | | | | | | | | | | | | | |
| Hindol | 30 | 16 | — | — | — | 1 | 2 | — | — | 2 | — | 1 | 2 | — | 1 | 3 | — | — | — | 2·4 |
| | | (53) | (—) | (—) | (—) | (3) | (6) | (—) | (—) | (5) | (—) | (3) | (7) | (—) | (4) | (10) | (—) | (—) | (—) | (8) |
| **Kalahandi** | | | | | | | | | | | | | | | | | | | | |
| Lanjigarh | 101 | 62 | 0·2 | — | — | 2 | 3 | ·2 | — | 6 | 3 | 2 | 10 | ·4 | (0.3) | (7) | — | — | — | 4.9 |
| | | (61) | (0·2) | (—) | (—) | (2) | (3) | (·2) | (—) | (6) | (3) | (2) | (10) | (·4) | (0·2) | (7) | (—) | (—) | (—) | (5) |
| **Puri** | | | | | | | | | | | | | | | | | | | | |
| Khandpara | 30 | 16 | — | — | — | 0·2 | 1 | 0·2 | — | 0·1 | — | 0·2 | 7 | 1 | 0·1 | 1 | — | — | — | 2·8 |
| | | (56) | (—) | (—) | (—) | (1) | (2) | (1) | (—) | (0·3) | (—) | (1) | (24) | (4) | ( 1) | (3) | (—) | (—) | (—) | (6) |
| Daspalla | 41 | 25 | — | — | — | 1 | 2 | 0·2 | — | 1 | — | — | 6 | 0·2 | — | 3 | — | — | — | 3·6 |
| | | (60) | (—) | (—) | (—) | (3) | (4) | (1) | (—) | (1) | (—) | (—) | (15) | (1) | (—) | (8) | (—) | (—) | (—) | (7) |
| | *Rainfall Zone—IX* | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | *Rainfall Pattern—$D_1E_3(A_2B_2)C_1D_1E_2$* | | | | | | |
| **Cuttack** | | | | | | | | | | | | | | | | | | | | |
| Jagatsinghpur | 102 | 76 | — | — | — | 0·1 | 1 | — | — | — | — | — | 14 | 0·1 | 2 | 1 | — | — | — | 7·4 |
| | | (75) | (—) | (—) | (—) | 0·1 | (1) | (—) | (—) | (—) | (—) | (—) | (14) | (0·1) | (2) | (1) | (—) | (—) | (—) | (7) |
| Niali | 37 | 22 | — | — | — | — | 1 | — | — | — | (—) | — | 10 | 0·2 | (1) | 0·4 | — | — | — | 0.8 |
| | | (62) | (—) | (—) | (—) | (—) | (3) | (—) | (—) | (—) | (—) | (—) | (28) | (1) | (3) | (1) | (—) | (—) | (—) | (2·0) |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Puri** | | | | | | | | | | | | | | | | | | | | |
| Nimapara | 100 | 48 | — | — | — | — | 3 | 0·1 | — | — | 3 | — | 25 | 0·3 | 0·2 | 5 | — | — | — | 15·4 |
| | | (48) | (—) | (—) | (—) | (—) | (3) | (0·1) | (—) | (—) | (3) | (—) | (25) | (0·3) | (0·2) | (5) | (—) | (—) | (—) | (15·4) |
| Bhubaneshwar | 92 | 61 | — | — | — | 0·1 | 0·4 | 0·1 | — | 0·1 | 5 | 0·2 | 13 | 1 | 1 | 3 | — | — | — | 7·4 |
| | | (67) | (—) | (—) | (—) | (0·1) | (1) | (0·1) | (—) | (0·1) | (5) | (0·2) | (14) | (1) | (1) | (3) | (—) | (—) | (—) | (8·0) |
| Pipli | 61 | 35 | — | — | — | — | — | — | — | — | — | — | 17 | — | — | 2 | — | — | — | 7·0 |
| | | (58) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (28) | (—) | (—) | (3) | (—) | (—) | (—) | (11·4) |
| Khurda | 61 | 44 | — | — | — | 0·1 | 0·1 | 0·1 | — | — | 3 | 0·1 | 11 | 0·1 | — | 1 | — | — | — | 2 |
| | | (73) | (—) | (—) | (—) | (0·1) | (0·2) | (0·1) | (—) | (—) | (4) | (0·2) | (18) | (0·2) | (—) | (0·4) | (—) | (—) | (—) | (3) |
| Ranpur | 26 | 16 | 0·1 | — | — | 0·1 | 0·2 | 0·1 | — | — | 5 | 0·1 | 2 | 0·3 | 0·2 | 0·4 | — | — | — | 1·9 |
| | | (60) | (0·3) | (—) | (—) | (0·4) | (1) | (0·3) | (—) | (—) | (18) | (0·4) | (9) | (1) | (1) | (2) | (—) | (—) | (—) | (6) |
| | | *Rainfall Zone—X* .. .. .. .. .. .. .. .. .. *Rainfall Pattern—$D_1E_3$ ($A_3$ $B_1$) $D_1$ $E_3$* | | | | | | | | | | | | | | | | | | |
| **Koraput** | | | | | | | | | | | | | | | | | | | | |
| Motu | 14 | 12 | 0·2 | — | — | 0·3 | — | — | — | 1 | — | — | 1 | — | — | — | — | — | — | — |
| | | (85) | (1) | (—) | (—) | (2) | (—) | (—) | (—) | (5) | (—) | (—) | (5) | (—) | (—) | (—) | (—) | (—) | (—) | (—) |
| Malkangiri | 54 | 39 | 1 | — | — | 2 | 3 | — | — | 2 | — | 0·4 | 3 | — | — | 1 | — | — | — | 2·6 |
| | | (72) | (1) | (—) | (—) | (4) | (6) | (—) | (—) | (3) | (—) | (1) | (6) | (—) | (—) | (2) | (—) | (—) | (—) | (4·8) |
| Jeypore | 55 | 31 | 0·2 | — | 4 | 1 | 6 | — | — | 2 | 1 | 1 | 3 | 0·1 | — | 3 | — | — | — | 2·3 |
| | | (57) | (0·4) | (—) | (7) | (3) | (11) | (—) | (—) | (4) | (—) | (2) | (5) | (0·3) | (—) | (5) | (—) | (—) | (—) | (4·0) |
| | | *Rainfall Zone—XI* .. .. .. .. .. .. .. .. *Rainfall Pattern—$D_2E_2$ ($B_4$) $C_1$ $D_1$ $DP$ $E_2$* | | | | | | | | | | | | | | | | | | |
| **Ganjam** | | | | | | | | | | | | | | | | | | | | |
| R. Udayagiri | 30 | 14 | 1 | — | 1 | 1 | 2 | — | — | 1 | 1 | 1 | 4 | — | 0·1 | 3 | — | — | — | 0·5 |
| | | (45) | (2) | (—) | (2) | (3) | (7) | (—) | (—) | (3) | (4) | (2) | (13) | (—) | (0·2) | (7) | (—) | (—) | (—) | (1·4) |
| Surada | 26 | 11 | — | — | — | — | 1 | — | — | 0·1 | — | 0·2 | 8 | 0·2 | 0·2 | 2 | — | — | — | 3·0 |
| | | (44) | (—) | (—) | (—) | (—) | (4) | (—) | (—) | (0·3) | (—) | (1) | (30) | (1) | (1) | (7) | (—) | (—) | (—) | 12·0 |
| | | *Rainfall Zone—XII* .. .. .. .. .. .. .. .. .. *Rainfall Pattern—$C_1D_1E_2(A_2B_2)C_1E_3$* | | | | | | | | | | | | | | | | | | |
| Chandbali | 40 | 38 | — | — | — | — | — | — | — | — | — | — | 0·3 | — | — | — | — | — | — | 1·3 |
| | | (96) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (1) | (—) | (—) | (—) | (—) | (—) | (—) | (3) |
| Dhamnagar | 46 | 37 | — | — | — | — | — | — | — | — | — | — | 5 | 0·3 | — | 0·2 | — | — | — | 3·1 |
| | | (81) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (11) | (1) | (—) | (0·3) | (—) | (—) | (—) | (7·1) |
| Bhadrak | 120 | 92 | — | — | — | 0·1 | — | — | — | — | — | — | 16 | 0·1 | — | 0·3 | — | — | — | 11·5 |
| | | (77) | (—) | (—) | (—) | (0·1) | (—) | (—) | (—) | (—) | (—) | (—) | (13) | (0·1) | (—) | (0·2) | (—) | (—) | (—) | (9·5) |
| Soro | 82 | 76 | — | — | — | 0·1 | — | — | — | — | — | — | 1 | — | — | 0·1 | — | — | — | 4·8 |
| | | (93) | (—) | (—) | (—) | (0·1) | (—) | (—) | (—) | (—) | (—) | (—) | (1) | (—) | (—) | (0·1) | (—) | (—) | (—) | (5·8) |
| Balasore | 54 | 45 | — | — | — | — | — | — | — | — | 0·1 | 0·1 | 1 | — | — | 0·3 | — | — | — | 7·5 |
| | | (83) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (—) | (0·1) | (0·2) | (2) | (—) | (—) | (1) | (—) | (—) | (—) | (13·8) |
| Nilgiri | 24 | 19 | — | — | — | 0·1 | — | — | — | — | — | 0·1 | 1 | 0·2 | — | 0·2 | — | — | — | 3·4 |
| | | (80) | (—) | (—) | (—) | (0·4) | (—) | (—) | (—) | (—) | (—) | (0·2) | (5) | (0·4) | (—) | (0·4) | (—) | (—) | (—) | (14·1) |
| Mayurbhanj | 46 | 41 | 0·1 | — | — | 0·3 | — | — | — | 0·4 | — | — | 2 | — | — | 0·3 | — | — | — | 1·5 |
| | | (89) | (0·2) | (—) | (—) | (1) | (—) | (—) | (—) | (1) | (—) | (—) | (5) | (—) | (—) | (1) | (—) | (—) | (—) | (3·1) |
| Udala | 52 | 46 | 0·1 | — | — | 1 | — | — | — | 0·2 | — | 0·2 | 2 | — | 0·1 | 0·3 | — | — | — | 2·1 |
| | | (88) | (0·3) | (—) | (—) | (1) | (—) | (—) | (—) | (0·4) | (—) | (0·3) | (5) | (—) | (0·3) | (1) | (—) | (—) | (—) | (4·0) |
| Baripada | 113 | 95 | — | — | — | 1 | — | 0·1 | — | 1 | 0·3 | 0·1 | 8 | 0·4 | (1) | 1 | — | — | — | 5·2 |
| | | (84) | (—) | (—) | (—) | (1) | (—) | 0·1 | (—) | (1) | (0·3) | (0·1) | (7) | (0·3) | (1) | (1) | (—) | (—) | (—) | (4·6) |

*includes jute which accounts for about 10 percent of cropped area.

# ERRATA

## RAINFALL AND CROPPING PATTERNS

**Volume XI**

ORISSA

| Page No. | Paragraph/ Table/Appendix No. | Line | As printed | As desired |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 2 | 2.4-Col.2 | 13 after Table 1 | $D_1E_3(A_2B_1)C_1D_3$ | $D_1E_3(A_2B_1C_1)C_1D_3$ |
| 3 | Table 2 | Col. 2 against tapioca | Te | Ta |
| 4 | Table 3 | Col. 2 line 6 | Bu | By |
| 4 | 2.14 | 4 | number | numbers |
| 4 | 3.1 | Col. 2 line 2 | 30 | 91 |
| 4 | 3.1 | Col. 2 line 3 | the remaining | 28 per cent |
| 4 | Table 4 | col. 8 heading | 73000 | above 3000 |
| 5 | 3.3 (b) | last | Dhenkenal | Dhenkanal |
| 5 | Table 5 | col. 10 heading | 7500 | above 500 |
| 5 | -do- | col. 5 row 2 | — | 1 |
| 6 | 3.6(b) | 5 | Red and | Red |
| 7 | 3.10 | 15 | parctically | practically |
| 8 | 4.1 | 3 | approximated | approximate |
| 8 | 4.1 | col. 2 row 10 of table | $D_1E_3(A_3B_1)C_1E_3$ | $D_1E_3(A_3B_1)D_1E_3$ |
| 8 | 4.1 | col. 3 row 12 of table | 528 | |
| 8 | 4.1 | col.4, row 12 of table | 109 | 10,528 |
| 9 | 4.6 | 4 | Bolagir | Bolangir |
| 9 | 4.8 | 10 | $Pd_1Pd_2Pu_4Mt_4$ | $Pd_1,Pd_2Pu_4/Mt_4$ |
| 9 | 4.9 | 2 | Balangir | Bolangir |
| 9 | 4.11 | 3 | P. | $Pu_4$. |
| 9 | 4.15 | 5 | $Cm_4Cf_4Cy_4/G_4$ | $Cm_4Cf_4Cy_4G_4$ |
| 9 | 4.16 | col. 2 row 3 of table | $Pd_4R_4O_4Pu_4Mt_5$ | $Pd_4R_4O_4Pu_4Mt_4$ |
| 10 | 4.22 | col.2 row 8 of table | Parlakhempundi | Parlakhemundi |
| 10 | 4.23 | 8 | density populated | densely populated |
| 10 | 4.28 | last | terms | times |
| 10 | 4.36 | col.2 row 2 of table | Kendrapora | Kendrapara |
| 10 | 4.40 | 4 | 40 | 30 |
| 10 | -do- | 5 | per cent of annual | cm |
| 11 | 4.44 | col.1 against Angul | $Pd_2M_2$ | $Pd_2Mt_4$ |
| 11 | -do- | col.1 against Koraput | $Pd_4O_4R_4Mt_4Pu_4$ | $Pd_4O_4R_4Mt_4Pu_5$ |
| 11 | 4.52 | col.1 against Sukinda | $Pd_2Pu_4$ | $Pd_1$ |
| 11 | -do- | col.1 against Tigiria | | $Pd_2Pu_4$ |
| 11 | -do- | col.2 row 10 | Adgarh | Athgarh |
| 11 | 4.54 | 1 | Cuttak | Cuttack |
| 12 | 4.57 | col.2 last but one line | Tigiria | — |
| 12 | 4.59 | 3 | the remaining 62 | 62 |
| 13 | 4.79 | 1 | occupies | occupies 44 |
| 13 | 4.80 | 1 | $Gm_4Cf_4Cy_4/G_4$ | $Cm_4Cf_4Cy_4/G_4$ |
| 13 | 4.81 | col.2 row 6 of table | Nilgeri | Nilgiri |
| 13 | 4.82 | 2 | area | areas |
| 14 | 5.6 | 4 from below | of | and |
| 14 | 5.7 | 2 | yield | yields |
| 20 | Appendix 2 | col.2 last line | Koraput | Kashipur |

M729Agri/76—18-10-77

# ORISSA
## RAINFALL PATTERN

## REFERENCE

—·—·— STATE BOUNDARY

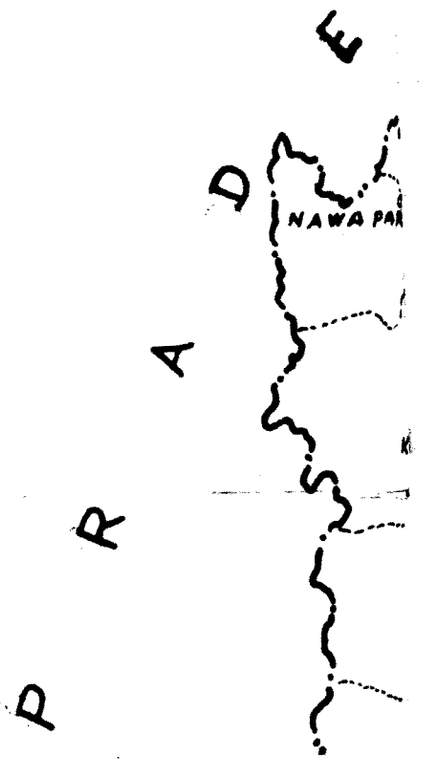
—·—·—·— DISTRICT BOUNDARY

– – – – – – P.S. BOUNDARY

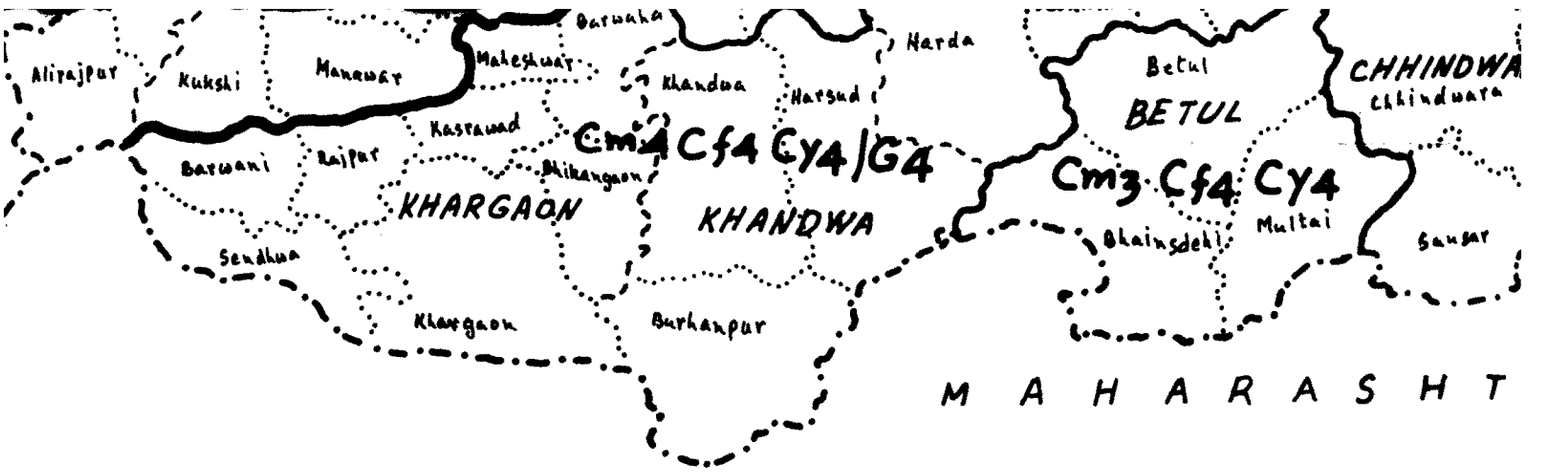
● ● DISTRICT / P.S. HQRS.

ZONES

| | |
|---|---|
| I | E4 (A2 B2) D1 E3 |
| II | D1 E3 (C4) C1 D1 E2 |
| III | D1 E3 (B3 C1) C1 E3 |
| IV | D1 E3 (B3 C1) C1 D1 E2 |
| V | D1 E3 (B4) C1 E3 |
| VI | D1 E3 (A1 B3) C1 E3 |
| VII | D1 E3 (A2 B2) D1 E3 |
| VIII | D1 E3 (A2 B2) C1 E3 |
| IX | D1 E3 (A2 B2) C1 D1 E2 |
| X | D1 E3 (A3 B1) D1 E3 |
| XI | D2 E2 (B4) C1 D1 E2 |
| XII | C1 D1 E2 (A2 B2) C1 E3. |




B
S
H
TAL SARA
SUNDA
BARGAON
SUNDARGARH
LEPHRIPARA
GOVIND
BHASMA
HEMGIR
LAIKERA
BRAJARAJ NAGAR
JHARSUGUDA
RENGAL
LAKHAN PUR
KUCHIN
KATARBAGA
AMBABHONA
HIRAKUD
SASON
JHAMANK
BURLA
SAMBALPUR
BHATLI
SAMBA
ATTABIRA
BARGARH
SONELA
DHAMA
NAKT
BHEDEN
JUJOMURA
BIJEPUR
BHARALI
JAGDALPUR
CHARMAL (030)
MELCHHAMUNDA
SINDHOL
DUNGRIPALI
BINKA
PAIKMAL
PADAMPUR
GAISILAT
LOISINGHA
BIRMAHARAJPUR
E4 (A2 B2) D1 E3
SAHEPUR
KHAPRAKHOL
BAUDH
MRIVAMUNDA
PATNAGARH
TARBHA
BOLANGIR
BOLANGIR
BAUDH-KHON
TUSRA GHANTAPADAN
PHULBANI
KANTAGANJ
SAINTALA
PHIRINGIA
BONGAMUNDA
TITLAGARH
KHAKIAR
SINDHEKELA
MADANPUR RAMPUR
BALIGUDA
KESINGA



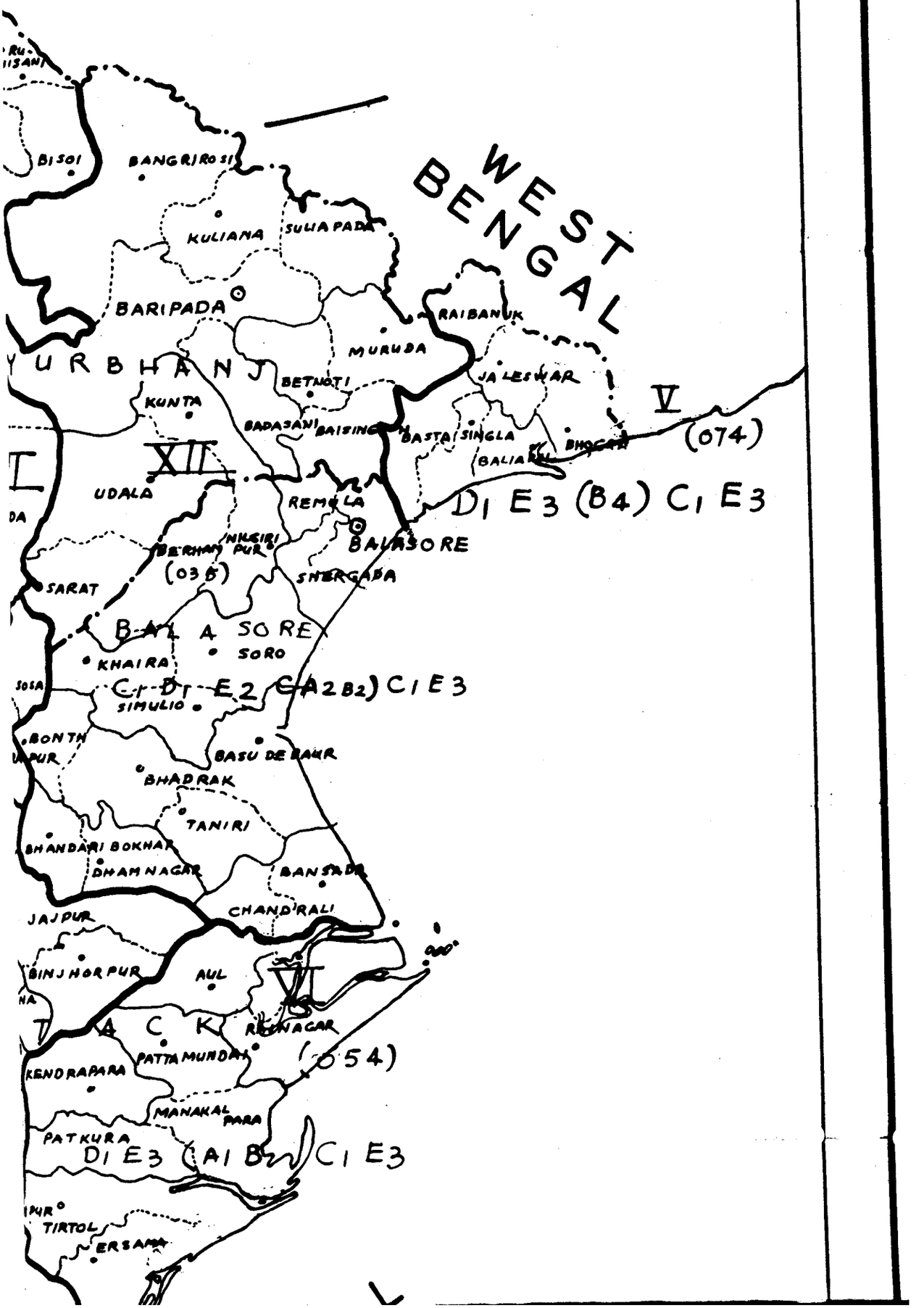

## LEGEND

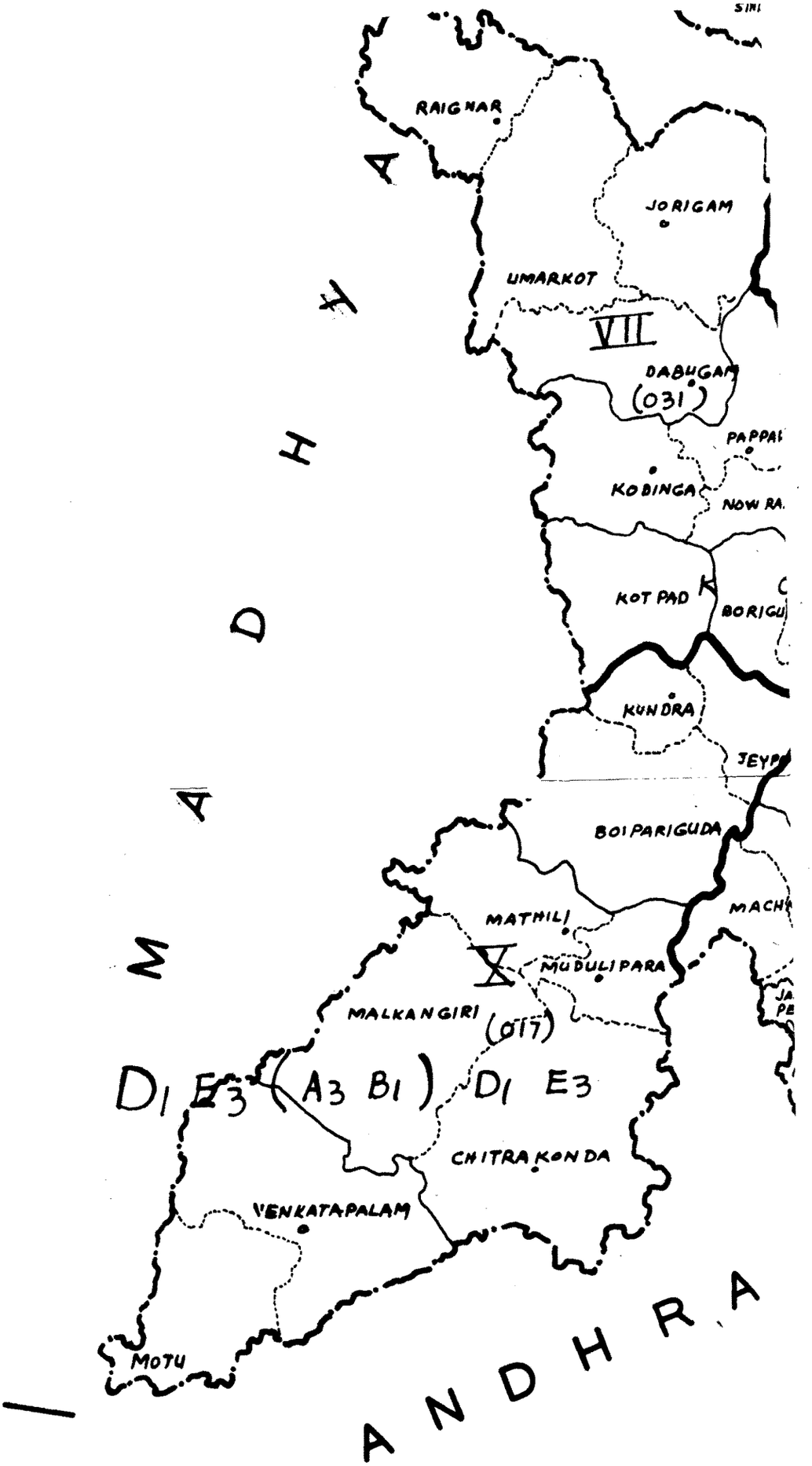
| LIVESTOCKS | SYMBOLS |
|---|---|
| CATTLE: | |
| Males over 3 years | Cm |
| Females over 3 years | Cf |
| Youngstock 3 years and under | Cy |
| BUFFALOES: | |
| Males over 3 years | Bm |
| Females over 3 years | Bf |
| Youngstock 3 years and under | By |
| Sheep | S |
| Goats | G |
| Horses/Ponies | H |
| Mules | M |
| Donkeys | D |
| Camels | Ca |
| Pigs | P |

A distribution which is the same over two or more adjoining taluks is called a Pattern, if the percentage of individual catagories is 10 or more and the total is not less than 70 Percent.

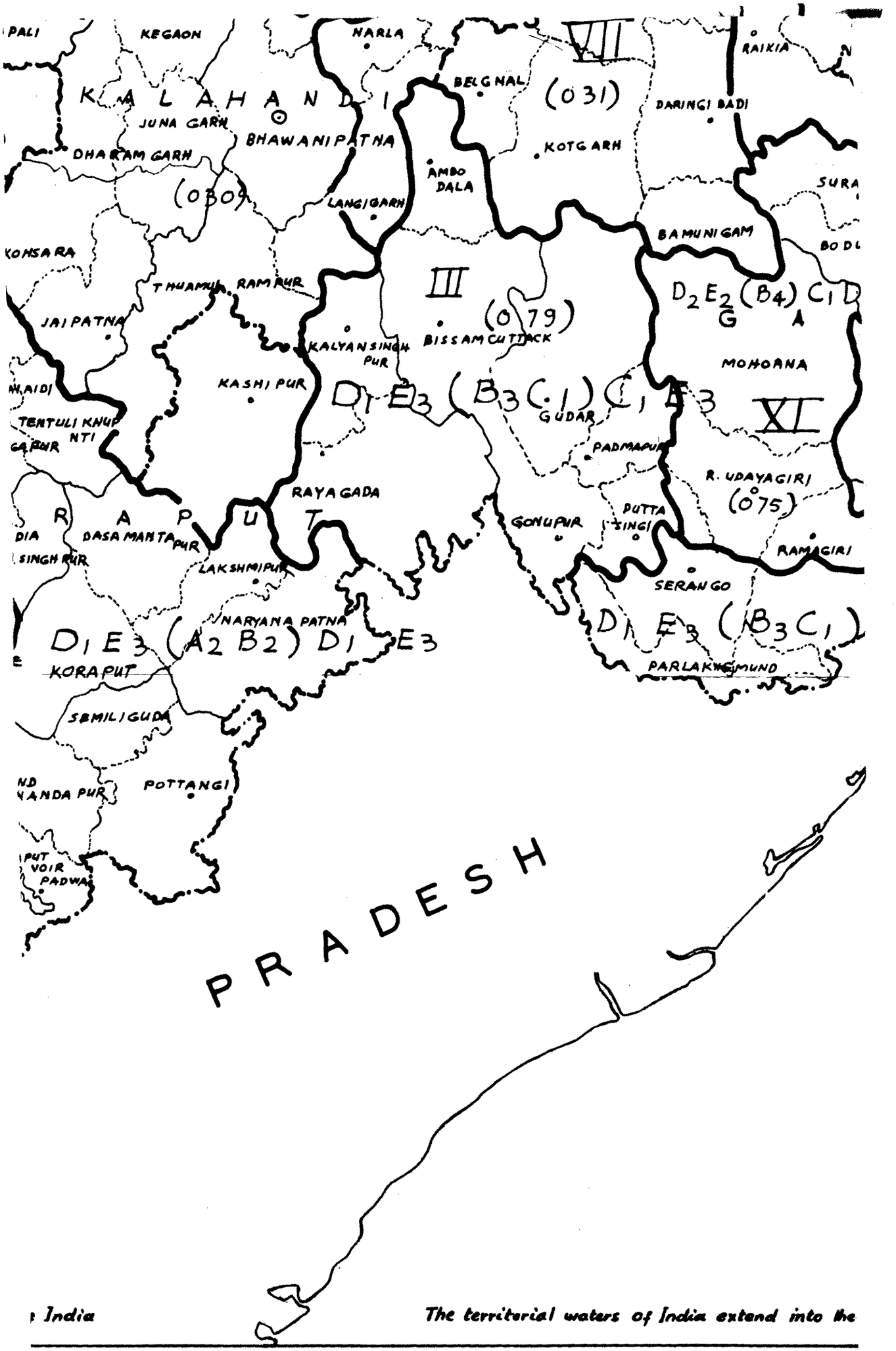
| Interval Subscript | Perentage of total livestock of Taluk |
|---|---|
| 1 | greater than 70 |
| 2 | 50-70 |
| 3 | 30-50 |
| 4 | 10-30 |
| 5 | Less than 10 |

| EXAMPLE: | Male cattle | Sheep | Goats |
|---|---|---|---|
| Livestock Pattern: | Cm3 | S4 | G4 |
| Percentage :- | 30-50 | 10-30 | 10-30 |


WEST BENGAL
BISOI
BANGRIPOSI
KULIANA
SULIAPADA
BARIPADA
RAIBANUK
MURUDA
URBHANJ
BETNOTI
JALESWAR
KUNTA
BADAJANI
BAISINGA
BASTA
SINGLA
BALIAPAL
BHOGRAI
V
(074)
D1 E3 (B4) C1 E3
XII
UDALA
REMUNA
BALASORE
BERHAMPUR
NIKIRI
(038)
SHERGADA
SARAT
BALASORE
SORO
KHAIRA
C1 D1 E2 (A2 B2) C1 E3
SOSA
SIMULIO
BONTH
BASU DEBPUR
BHADRAK
TANIRI
BHANDARI BOKHAR
DHAMNAGAR
BANSADA
CHANDBALI
JAJPUR
BINJHARPUR
AUL
VI
CUTTACK
KENDRAPARA
PATTAMUNDAI
(054)
MANAKAL PARA
PATKURA
D1 E3 (A1 B2) C1 E3
TIRTOL
ERSAMA

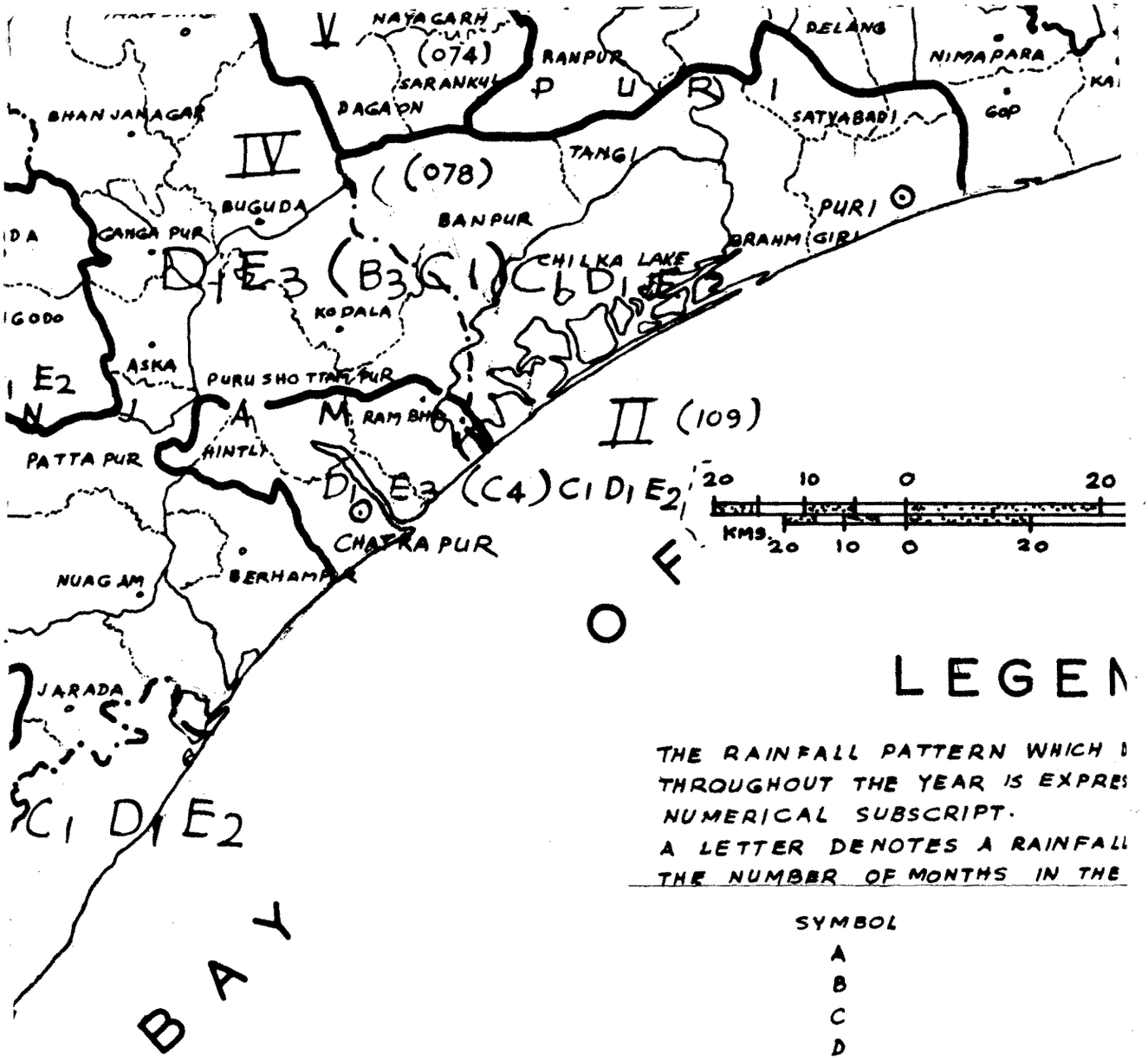



Based upon Survey of India map with the permission of the Surveyor Genera




India

*The territorial waters of India extend into the*




# LEGEN

THE RAINFALL PATTERN WHICH I
THROUGHOUT THE YEAR IS EXPRES
NUMERICAL SUBSCRIPT.
A LETTER DENOTES A RAINFALL
THE NUMBER OF MONTHS IN THE

| SYMBOL |
|---|
| A |
| B |
| C |
| D |
| E |

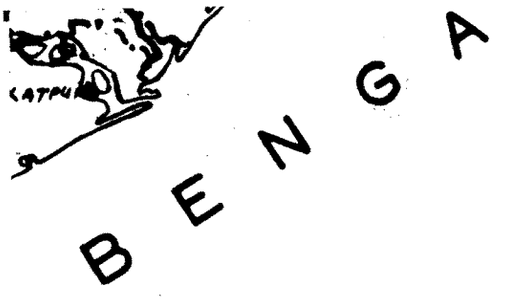
THE CODED FORM OF EACH PAT
THE THREE SEASONS FEBRUAR
JANUARY. THE CENTRAL IS ENT

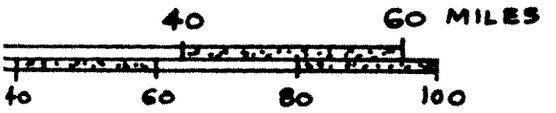
THE AREA COVERED BY A RAINFA
MAP ARE SERIALLY NUMBERE

ROMAN NUMBERS INDICATE ST

THREE-DIGIT FIGURES IN ARABIC
ALL-INDIA EQUIVALENTS.

*sea to a distance of twelve nautical miles measured from the appropriate base line.*




# D

ESCRIBES THE DISTRIBUTION OF MONTHLY RAINFALL
ED IN CODED FORM WITH LETTER SYMBOLS AND

INTERVAL AND THE SUBSCRIPT TO EACH LETTER
NTERVAL.

RAINFALL INTERVAL CENTIMETRES PER MONTH

GREATER THAN 30
20 - 30
10 - 20
5 - 10
LESS THAN 10, IF THE PATTERN BEGINS WITH A OR B.
LESS THAN 5, IF THE PATTERN BEGINS WITH C, D OR E.

ERN CONSISTS OF THREE GROUPS CORRESPONDING TO
TO MAY, JUNE TO SEPTEMBER AND OCTOBER TO
IRED IN BRACKETS.

I PATTERN IS TERMED A ZONE AND THE ZONES IN THE
).

ATE RAINFALL ZONES.

NUMERALS WITHIN BRACKETS GIVE THEIR CORRESPONDING